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VIEWS, NEWS AND INTERVIEWS.

Col. N. H. Heft, who is at the head of the electrical department of the New York, New Haven & Hartford Railroad, has devised a method by means of which locomotive "sparks" can be utilized as fuel. The "sparks" are the cinders which accumulate under a screen in the smoke-stacks of locomotives. Hitherto they have been thrown away. Colonel Heft's scheme is in operation at the new electric power-house in Berlin, Ct. The furnaces under the boilers in this power-house are similar to others, except that at the rear of the grate is located the blowing apparatus, which supplies the oxygen required for the consumption of the fuel. It is said that it requires somewhat more of the "sparks" than of coal to make steam, but that steam is produced at a very low cost.

It is stated that the Pennsylvania Railroad is to abandon the use of wooden telegraph poles, and will adopt in their place a steel truss pole. The new pole will be about 20 feet in height, and about 10 feet broad at the base. The poles will be set in a foundation of Portland cement, to which they will be bolted with steel rods. The upper framework will have a capacity of 20 wires.

A London electrical paper prints some interesting statistics as to the development of the telephone in France, Germany and Switzerland. There are at present 112 towns in France provided with the telephone system, and the total number of subscribers is 18,191, of which 9,653 are in Paris. The comparison of subscribers to telephones is highest in Cannes, where there is one telephone to every 120 inhabitants; and it is lowest in Toulouse, Tours and Orleans, where there is one for every 500. In Germany (excluding Bavaria and Wurtemburg) there were, at the date of the latest statistics, 397 towns provided with the telephone. There were 83,409 subscribers, and the number of messages is given at 424,000,000 a year, while for France the latter figure is given at 74,000,000. In Bavaria, and especially in Wurtemburg, telephony is very extensive. In Switzerland the communications per year were only about 15,000,000. Tariff is highest in France compared with most of the Continental towns.

The Philadelphia Electrical Bureau, through its electrical committee, has asked the City Councils for $1,042,004 for its maintenance during 1898, as against $979,180 last year. The increase is to be used for additional extensions.

A large number of persons are eagerly looking forward to the forthcoming report of the Hon. Carroll D. Wright, Commissioner of Labor, on the question of municipal ownership. It is said that in 1888 there were in the United States 544 municipal waterworks, five municipal gasworks, and no electric lighting plants. It is also said that at the present time there are 1,350 municipal waterworks, 12 municipal gasworks, and 340 municipal electric lighting plants. The majority of the electric lighting plants owned by cities and towns are located in Massachusetts.

Spokane, Wash., is patting itself on the back because it secures its city lighting at a very low rate. It has a contract with the Edison Electric Illuminating Company for 200 arc lights of 2,000 candle-power each, burning all night, at $48 a year for each light.

CAPTAIN ROBERT MCCULLOCH, OF ST. LOUIS, PRESIDENT AMERICAN STREET RAILWAY ASSOCIATION.

The street-car men's union, of Chicago, last week applied for an injunction against the Chicago Street Railway Company, to prevent the company from discharging employés because they are members of the union. It is claimed that officials of the company have told the employés to cease paying dues to the union.

STREET RAILWAY MEN AT NIAGARA FALLS.

The Sixteenth Convention of the American Street Railway Association Successfully Begun With a Large Attendance and Magnificent Exhibits.

THE FIRST DAY'S PROCEEDINGS—ADDRESS OF PRESIDENT ROBERT MC'CULLOCH — PARTIAL LIST OF THOSE IN ATTENDANCE, AND A DESCRIPTION OF SOME OF THE EXHIBITS — CONVENTION NOTES AND INCIDENTS.

NIAGARA FALLS, October 19—The sixteenth annual convention of the American Street Railway Association began its sessions here to-day under most favorable auspices. The representative street railway men are present in large numbers, and a programme of business meetings and visits to the important electrical establishments and the ever-attractive scenic effects are outlined for each day. The general committee, of which Mayor A. C. Hastings, of Niagara Falls, is chairman, has charge of the reception and entertainment.

The Exhibition Hall has rapidly changed from a scene of chaos and confusion, and by this evening every exhibit will undoubtedly be in place, and each in its own way a point of investigation by the practical railway men in attendance. The programme as announced in the ELECTRICAL REVIEW last week will be carried out.

President Robert McCulloch, of St. Louis, presided at the opening of the convention, and, after an address of welcome by Mayor Hastings and some routine business, delivered the following address:

ADDRESS OF PRESIDENT M'CULLOCH.

GENTLEMEN OF THE AMERICAN STREET RAILWAY ASSOCIATION: Our convention assembly for the sixteenth annual period is

within the sound of nature's greatest wonder, but the wonders that are wrought in our own immediate application and appropriation of nature's resources are even more startling and awe-inspiring than the great Niagara Cataract. If our ancestors of two centuries ago could sit in judgment on our doings of to-day we would unquestionably be required to involuntarily undertake the feat of the gallant Captain Webb, and if, perchance, we survived the perils of the raging torrent, the bonfires of our aboriginal predecessors would be rekindled on the cliffs below, and a fat-trying would take the place of our discussions and merry making, as there could be no escape on our part from the charge of witchcraft. These great falls were worshipped by our red brother; the venturesome explorer and historian dipped his pen in consecrated fluid as he wrote reverentially of their grandeur; the poet and the maiden everywhere have sung of them in enchanting praise; reverence and poetry and romance have characterized the stories which tell us of them; but the matter-of-fact Yankee of to-day, casting reverence and poetry and romance to the winds, has harnessed them like an old plow-horse, and compelled them, just as subserviently, to do his bidding; they make heat and light and power for all purposes; they revolutionize the processes of the manufacturer and the chemist, and ere we meet here again they will, without doubt, have been saddled with the menial duties of cooking and washing and tilling the soil of all the country around. The enabling element for the utilization of this wasted energy of the past is electricity, in the development and search for uses of which the scientist and manufacturer sleep not, neither do they rest. They furnish us with their best and latest devices and appliances to-day, and to-morrow these devices and appliances are obsolete. To keep our place in the procession we must join in the cry of "The King is Dead, Long Live the King." We must discard the old and adopt the new, or else be ground under the wheels of this juggernaut of progress. Unfortunately, if we endeavor to "shun Scylla, we are in danger of being wrecked on Charybdis;" hence we assemble here to counsel together as to how we may best shape our course. To learn more of this revolutionary factor in our business, to discuss this and other kindred subjects, to compare our experiences, to meet and greet each other, to renew old friendships and acquaintance, and to form new ties, to be forced, if need be, to recognize that "there are other pebbles," to find that the American Street Railway Association is filled with men to know whom is both an honor and a pleasure—these, my friends, are some of the things which have brought us together, and it is hoped that a full measure of pleasure and profit will reward all who honor us with their presence.

Our local brethren, with a hospitality as abounding and exhaustless as the never-ceasing flow of their great river, have provided for our physical comfort and entertainment. We beseech them not to seduce us from a proper contemplation of the business before us.

Our noble ally, our helper in all the good work we accomplish, our always alert, jovial and genial friend, the supply man, has contributed, as usual, his share to our entertainment and enlightenment. He is here to show us the best of everything he has. He is not, in one sense, a member of our association; he does not participate in our deliberations; but he stands at our threshold, and the vigilance which he exercises, that none may escape, is worthy of our emulation in the conduct of our business. Let us show our appreciation of his efforts by inspecting his wares, by loading him with orders and by fraternizing with him, that his enjoyment of the occasion may be equal with ours.

We have still another and a new element in our gathering for this year. Whilst we are here engaged in the discussion of questions pertaining to the construction, equipment and operation of the roads and interests in our keeping, there is assembled near by, and also in deliberative convention, an earnest, intelligent, enthusiastic body of mostly younger men than ourselves. They have in view the same objects which bring us together—a betterment in the performance of street railway work. Their duties, whilst distinct and apart from ours, are just as essential, and the requirement is for the same degree of intelligence, industry and integrity. Their organization is young, and they are just starting out in their efforts to enlighten each other by a mutual interchange of information as to methods and ways. I allude to the Street Railway Accountants' Association. Let us not extend to them the right hand, but both hands, and help and encourage them to persevere in their good work. Their interest and efficiency in the performance of their duties is susceptible of the same betterment by convention as ours. If they find it desirable and convenient to meet at the same time with ourselves, and thus extend the acquaintance and good-fellowship between the operating and accounting departments which must result from contact, let that arrangement continue; but if it be considered wiser to have two separate meeting times and places, that may be the plan, but they should have our encouragement and indorsement, and even financial support, if necessary.

Our meetings are always attended by quite a number of persons engaged in the same business as ourselves, but whose companies are not members of the association,

Mr. T. C. Penington, of Chicago, Secretary American Street Railway Association.

and we receive requests for information from the same source, which information is always cheerfully given. We would not like to close our doors against these non-members, but we would be glad to enter their names in our official lists, and their annual dues, which is only a small amount, would fill an aching void in our treasury.

There is still another class who, although members of our association, seldom or never grace our meetings with their presence. Whether this may be from a lack of time, a feeling of exclusiveness or a consciousness of a possession of all the knowledge attainable concerning our business, I know not. But if the first, an effort and sacrifice might be made experimentally; if the second is the cause of their absence, a surprise and discovery is in store for them if they will only develop it. And if the last reason keeps them away, a feeling of charity and goodwill for their fellow laborers should impel them to come amongst us and show us how to surmount our perplexing obstacle.

The questions to be discussed in our convention have been selected with reference to newer developments and applications. The gentlemen honored by selection (and the honor should be much coveted) to prepare papers have all been urged to be present and personally present their efforts, thus giving them a force that can only be imparted by the enthusiasm of the author. Time will be given for the presentation and discussion of each paper, and it is hoped the discussions will be free and exhaustive.

Mr. H. M. Littell, of New York City, Chairman Executive Committee, American Street Railway Association.

I wish that my successor in office may have a secretary and executive committee who so thoroughly realize and faithfully perform their duties as have the secretary and executive committee who have assisted me in the performance of my very pleasant work.

And now, my friends and brethren, thanking you with more earnestness than my language can express for the unexpected honor with which you crowned me a year ago, and promising an impartial ruling on all questions presented, we will proceed with the business of the convention.

Reports followed, and after the reading of two papers, the convention adjourned for the day to visit the Niagara Falls Power Company and other factories in that vicinity.

CONVENTION NOTES.

G. C. Kuhlman Company, of Cleveland, Ohio, have quite an exhibit of suburban cars.

Among the places suggested for the next meeting are Detroit, Cincinnati, Omaha, Louisville, Richmond, and, lastly, Asheville.

The Standard Paint Company is represented by Manager Shainwald, of the Chicago office, brother of the president of the company.

Mr. Frank Laughlin, of the Solar Carbon Company, Pittsburgh, is one of the youngest as well as handsomest gentlemen present.

Secretary Beardsley, of the local management, has been untiring in his efforts, and should be satisfied with the success he has achieved.

Mr. H. B. Kirkland, of New York, representing the Cutter Electrical and Manufacturing Company and the American Circular Loom Company, is in attendance.

Secretary T. C. Penington is in attendance, and is well occupied. Among the other busy ones is chairman H. M. Littell, of the executive committee, New York city.

Mr. Thos. F. Morrin, of the Clonbrock Boiler Company, is in attendance and greeting numerous users of his widely known boiler. Mr. Chas. A. Sammons, of the same company, is also present.

The Niagara Falls Chamber of Commerce has left nothing undone that would tend to the comfort and entertainment of the visitors. A local committee of ladies is looking after the wives and ladies of the visitors, and many pleasant outings are planned.

Col. W. J. Cooke, vice-president of the McGuire Manufacturing Company, of Chicago, is at the convention in all his glory. He is adding to the popularity of McGuire trucks by presenting his friends with a very neat pocket magnifying glass incased in aluminum.

The *Street Railway Journal* distributed a magnificent souvenir number at the convention. It was also their international number, and consisted of 464 pages, with a particularly attractive cover. President James H. McGraw and staff received many congratulations over this very excellent publication.

The large banquet on Thursday night will probably be more largely attended than any previous similar event. A number of excellent toasts will be responded to by able speakers. The ladies are very properly included. It is evident that these four days at Niagara Falls will be memorable ones in the experience of the street railway men and their ladies.

Elmer P. Morris, of New York city, the well known electrical supply man, is distributing to his friends and customers at the convention a ribbon bow, fastened in the center with a miniature American flag. This souvenir is designed as a badge to be worn upon the coat, but it is probable that before the convention is over some of the delegates will be wearing them for earrings.

Probably the most important exhibition of street railway cars and trucks ever shown by the John G. Brill Company, of Philadelphia, is attracting the attention of every one at this convention. In addition to a large and admirably located space in the exhibition hall, filled with the latest developments in this line, the enterprising company has a track exhibit outside the hall.

The Westinghouse Electric & Manufacturing Company has a large space filled with their various machinery and

appliances for street railway work. There is not an electric street railway man in attendance but who often visits this well arranged exhibit.

The Forest City Electric Company, of Cleveland, Ohio, has a fine location, and exhibits the widely known "protection" rail bond and commutator bars. Mr. W. B. Cleveland, the proprietor, is present in person, and is one of the electrical pioneers.

The Central Electric Company, of Chicago, is ably represented by Agent Adams, and a very complete line of street railway apparatus adorns their well arranged space. Probably no supply house in the country carries as extensive and as thoroughly up-to-date line of goods in this field as the Central, and the promptness with which they completely fill large orders has made them highly popular with street railway purchasing agents.

A large Chicago delegation arrived Tuesday morning, among them being M. B. Austin, Jas. Atkinson, W. T. Van Dorn, Chas. Wilkinson, Geo. Whyte, C. S. McMahan, W. R. Garton, C. J. Reilley, Thos. C. Penington, W. K. Bowen, J. W. Meaker, E. P. Carry, Jr., J. Holt Gates, Geo. T. Collins, C. E. Mark, A. S. Dexter, J. T. McRoy, Edw. S. Hodgkins, F. P. Luther, E. S. Bowers, Geo. A. Hurd, E. P. Morris; C. D. Wyman, O. M. Ran, Milwaukee.

The New York Central brought in from New York and vicinity, Tuesday, A. M., a large number of delegates. Among these were Messrs. E. Peckham, Chas. Blizard, W. L. Candee, Thomas E. Newton and Charles L. Tolles, Hartford; James H. McGraw, Charles W. Price, H. G. Issertel, E. S. Higgins, Messrs. Woodruff and Hughes and Charles Yerkes Flanders, Philadelphia; J. R. Ford, R. Devens and Messrs. Simmons, McRoy, Storey, Kittridge, Hill, Adair, Barrett, Pond and McCartney.

The exhibition of the famous Peckham trucks occupies 800 square feet, besides a track exhibit of the heavy railroad truck. Some four different styles of the swivel truck are exhibited and one Excelsior truck, besides several others. The company is ably represented by President E. Peckham, E. G. Long and C. S. Ackly, of New York; C. A. Terry, of Kingston; J. A. Hanna, of Chicago; A. W. Field, Boston.

MR. W. CARYL ELY, PRESIDENT BUFFALO AND NIAGARA FALLS ELECTRIC RAILWAY.

MR. BURT VAN HORN, GENERAL MANAGER BUFFALO AND NIAGARA FALLS ELECTRIC RAILWAY.

MR. C. K. MARSHALL, SUPERINTENDENT BUFFALO AND NIAGARA FALLS ELECTRIC RAILWAY.

AMERICAN STREET RAILWAY ASSOCIATION CONVENTION AT NIAGARA FALLS, N. Y.—A VIEW IN THE EXHIBITION HALL PHOTOGRAPHED ON MONDAY MORNING BEFORE THE TROUBLE REALLY BEGAN.

THE GENERAL ELECTRIC COMPANY AT THE STREET RAILWAY CONVENTION.

The General Electric Company's space is immediately to the left of the entrance on Walnut street, and the exhibit occupies 1,100 square feet. The moving part consists of motors mounted on trucks. On a pair of double trucks, an axle of one carries a G. E. 53 forty-five-horse-power motor, while on the other axle a 22-inch electric brake is mounted. On the other truck, one axle carries a G. E. 51 eighty-horse-power motor, while on the other axle is a 26-inch electric brake. This type of brake is designed for trailer car use or for application to the unoccupied axle of a car with a single equipment only, the stationary part of the brake being held in position by an iron bar attached to the truck frame. On a set of Brill double trucks will be mounted four G. E. 57 fifty-horse-power motors with electric brakes. This equipment is similar to that used on the Cleveland and Lorain road where a high-speed service of 50 miles an hour is carried on. To secure the necessary space on the axle for motor and brake the wheels on these trucks are dished. A Peckham cantilever truck will carry a standard G. E. 52 twenty-seven horse-power motor, and all will be equipped with series parallel controllers.

The controller used on the Brill truck is of the B 8 type. The G. E. 51 and G. E. 53 equipment is handled from one controller, either as a double equipment operating both motors, or by cutting out either motor as a single equipment. The wheels between the motor and the axle carrying the electric brake are geared together by means of bevel gears beneath the platform on which the truck rests. A G. E. 52 one hundred and seventy-five-horse-power motor is shown, but not in operation.

In the Barney & Smith Car Company's exhibit, two G. E. 1,000 motors are shown on a pair of that company's Class B trucks; while in the Peckham company's exhibit, two of the G. E. 52 twenty-seven-horse-power motors are shown by that company on one of its trucks. The General Electric Company also equipped a car for the Duplex Company, of Boston, constructed by the Jackson Sharp Company, of Wilmington, on Peckham cantilever truck, with two G. E. 1,000 motors, electric brakes and the new B 13 controller. This is shown in active service on the tracks of the Buffalo & Niagara Falls Railway.

The apparatus showing the operation of the magnetic blowout comprises four types of automatic circuit breakers, K, L, M and Q, arranged as for breaking currents up to 200 amperes. The H. D. lightning arrester, also fitted with the magnetic blowout device, is shown discharging under high-potential current obtained from a Thomson X-ray inductorium to represent lightning, the discharge to be followed by current from the 500-volt circuit. This enabled visiting delegates to appreciate the method by which lightning discharges are safely handled in these arresters. The same panel will carry another lightning arrester and a voltmeter. Ten of the G. E. railway arc lamps illuminate the space. The headquarters of the General Electric Company are at the International Hotel, where its interests were cared for by the following, and other, representatives:

Railway department: W. J. Clark, general manager; W. B. Potter, chief engineer; R. E. Beach, L. D. Tandy. Supply department; J. R. Lovejoy, general manager; E. C. Wirt, chief engineer; J. E. Aitken.

MODERN COMPRESSORS FOR AIR-BRAKING.

BY E. J. WESSELS.

Although compressed air was known in Aristotle's day, and has long been used for a variety of work, its application in the field of electric traction remained in an undeveloped state until recent years. So long as horse cars were the order of the day, no necessity existed for its use in braking surface cars. Shortly after the first electric car was put in service, the company of which I have the honor to be managing director, met the need which arose by furnishing an air-brake system, operated by a single or double acting compressor, for controlling electric and cable cars.

As electric traction developed increased demands were made upon us for apparatus of higher efficiency than had sufficed in the dawn of street railroading. As a result, not only had existing conditions to be confronted and met, but, what was fully as important, a system had to be evolved which would successfully meet the radical changes which became necessary. The air-brake system really had to be ready before the need for it had become fully apparent. No time was granted for experimenting after the high-efficiency car motors were in place.

With these special needs in view an electric compressor embodying radical changes had to be designed. Many experiments were made with the initial outfits and large outlays were necessarily incurred without always being followed by satisfactory results. It may be admitted with perfect frankness that the first apparatus left much to be desired. We had to rely upon the reports and friendly criticisms of railway managers in order that defects might be cured and that each installation might be an improvement upon its predecessor. Some of our friends realized that their interests and ours were very closely allied, and through them we obtained important help.

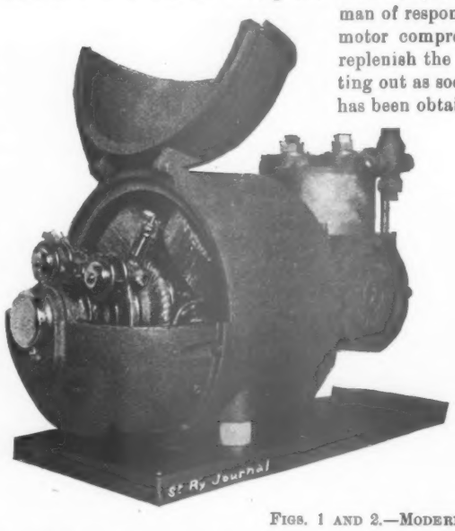
The problem of braking by air, high-speed, heavy cars, running in trains, is not as simple as might appear at first blush to the uninitiated. It becomes more complicated when the factors of heavy grades, frequent stops and numerous crossings are involved. A motor compressor which answered in 1895 falls short of the requirements of 1897. With a full appreciation of this fact, our company's aim has been ever to keep in the van. The illustrations accompanying this article are not "manufactured," but taken from real life, and represent the interior and exterior of our latest machine as actually photographed. Reference to some of its features may be timely, and it will be seen wherein this type of air compressor differs from all others. The one and one-half-horse-power type is illustrated. The motor compressor is very compact, being but 26½ inches long by 15 inches wide by 18½ inches high. The complete weight is 400 pounds. The motor is of the ironclad, multipolar, slow-speed series type. It was found after repeated experiments that the use of gears necessitated a much bulkier machine, and that the noise arising from a geared machine was very much greater than from the other type. This noise was intensified after the gears showed wear. For this and other reasons the "geared" type was abandoned.

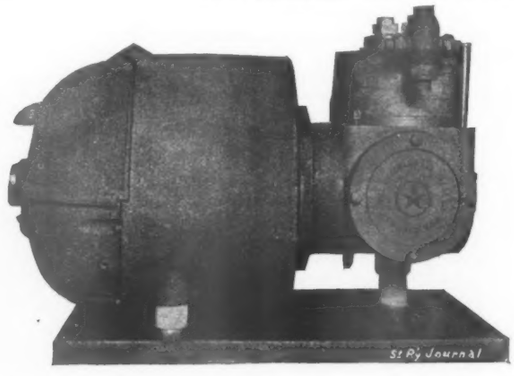
While our motor is absolutely rain and dustproof, nevertheless the construction is such as to make the brushes readily accessible. It will be noticed that the commutator is of very generous proportions, as are also the brushes. Special brush-holders are provided which are exceedingly convenient. Their long springs insure even tension of the brushes and require only very infrequent adjustment. The wide insulating surfaces prevent leakage through "creeping." In this motor extraordinary precautions have been observed throughout for obtaining the strongest and most durable insulation.

While the armature is of the slotted drum type (such as is used in the best sort of street railway motors), the winding is special, being of the well known Hochausen type. It should be stated that ours is the only company which is authorized to use the Hochausen patents in air-compressor work. Damaged sections can be renewed (in case of injury), as is common in car motor armatures. The machine is thoroughly protected against ingress of oil from bearings and compressor.

The compressor is of the single-acting type, with double cylinders which are placed vertically, with trunk pistons connecting directly to eccentrics in crank case. The pistons are carefully balanced, to insure a minimum of noise and freedom from vibration. The eccentrics are effectively lubricated by revolving in a closed chamber partly filled with oil, which is kept at such height as always to be in contact with the sliding surfaces. The compressor is bolted to the end of the motor and the shaft is a prolongation of the armature shaft, although it does not form a part of it. The compressor has a capacity of 11 cubic feet of free air per minute when working under a gauge pressure of 60 pounds per square inch. It is capable of operating with great economy, even at 100 pounds pressure, although in straight air work the maximum pressure required by the Standard system is 60 pounds. The remarkably high efficiency of the compressor is largely due to the design of the valves. These combine ease of access with a minimum loss arising from clearance. Being made of steel, they are very light, and are practically indestructible. The air supply is drawn from a chamber which, although dustproof, has so large a filtering surface that the work of drawing the air through the same is inappreciable.

This modern motor compressor has been in operation for a number of months and has been mounted on a number of cars with very satisfactory results. The operation is completely governed by the automatic current controller, which relieves the motorman of responsibility by starting the motor compressor when necessary to replenish the air supply, and by cutting out as soon as the needed supply has been obtained.





FIGS. 1 AND 2.—MODERN COMPRESSORS FOR AIR-BRAKING.

In view of the recent advent of the third-rail and Sprague systems, he indeed would be a bold prophet who would undertake to predict what the next five years may have in store for the traveling public. But it is safe to assert that, no matter what form of electric construction may become the recognized standard of the future, the modern air compressor will be found doing its work of maintaining a sufficient air supply (in connection with an air-brake system) to curb the speed of what would often otherwise prove "wild" trains or cars. For such work it is singularly well adapted, and its place is not likely to be usurped by any other forms of braking apparatus, with their pronounced weaknesses and limitations.

Death of W. H. Forbes.

Mr. W. H. Forbes, of Boston, died on October 12 at his Summer home on Naushon Island, Buzzards Bay. Mr. Forbes was president of the American Bell Telephone Company during its earlier history, and to him and Mr. Theo. N. Vail, the general manager of the company, the credit is largely due for the great success of the company, growing out of their prompt realization of the commercial importance of the invention of the electric telephone. Mr. Forbes was about 55 years old and leaves a widow and several sons.

ELECTRIC LIGHT FLASHES.

Milan, Mo., has voted to issue $18,000 bonds for electric lights and waterworks, 314 to 9.

Lebanon, Ill., has let a contract for a municipal electric light plant to cost $8,000. The city will be illuminated by 20 arc lights and 200 incandescent lamps will be furnished.

The Edison Electric Illuminating Company of Boston has declared a regular dividend of one and three-fourth per cent, payable November 1. Books closed October 15, reopen November 1.

At a largely attended meeting Randolph, Vt., recently voted unanimously to accept the proposition of the White River Electric Company to put in electric lights, and granted a 10-years' franchise.

J. D. Edwards, the owner of the electric light plant at Decatur, Ill., that was destroyed a few nights ago by order of the City Council, has begun suit for damages in the sum of $15,000. Suit was brought against each of the councilmen, city marshal, street commission and each of the workmen who aided in cutting down the poles and wires.

At the meeting of the Clyde, N. Y., Electric Light Company the following officers were elected for the ensuing year: Directors, L. C. Moses, George H. Lange, Charles W. Field, John Moyer, Peter Moyer; president, Charles W. Field; vice-president, George H. Lange; secretary and treasurer, L. C. Moses.

The Columbia Electric Light and Gas Company, of Portsmouth, Va., has been incorporated by Charles Adamson, president; William E. Stokes, secretary and treasurer; Charles Adamson, William E. Stokes, Griffin Callahan and J. Walter White, to manufacture, sell and transmit to consumers electricity and gas for light, heat and power. Capital stock $5,000, with power to increase to $100,000.

The Imperial Electric Light and Power Company, of St. Louis, a new comer in the electric lighting field in that territory, has asked the Board of Public Improvements for permission to construct an eight-foot tunnel across St. Charles street, and to build a manhole between Ninth and Tenth streets on St. Charles sixteen by eight feet in size. The company also desires to increase the number of its ducts in the common conduit from six to sixty.

A New Electric Railway Motor.

In line with the G. E. 52 and G. E. 1,000 railway motors, the General Electric Company announces a third, the G. E. 57. This is called forth by the success and popularity of the G. E. 1,000, to which it is similar in design, but of greater capacity, while still as compact and simple. It is intended for heavy city and suburban work, and is suitable for service of that class, either as a two or four-motor equipment.

The G. E. 57 has an output of 50 horse-power at 500 volts, rated according to standard General Electric basis, a maximum rise of 75 degrees centigrade in the temperature of the windings after a run of one hour at rated load, the temperature of the surrounding air not exceeding 25 degrees centigrade.

FIG. 1.—G. E. 57 RAILWAY MOTOR, FRONT END.

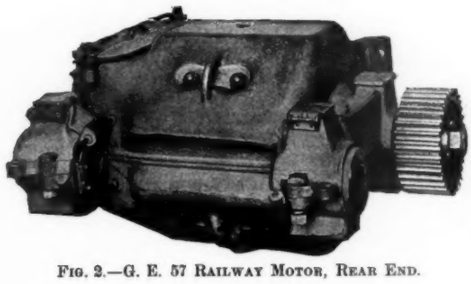


FIG. 2.—G. E. 57 RAILWAY MOTOR, REAR END.

The frame is of similar construction to that of the G. E. 52 motor. It is steel, cast in two bowl-shaped pieces, with a hand hole in the lower half directly beneath the commutator. This permits free access to the bottom of the motor for inspection or cleaning. The frame is both water and dustproof, the cover plate of the top half being provided with a felt gasket and clamping bolts, as in the G. E. 1,000 motor. The motor has four laminated poles, each having a separate coil held in place by the pole-piece, which is bolted to the frame, the bolts projecting through the frame with nut and lock washer on the outside.

Knowing the amount of trouble that has been experienced by street railway companies from small motor bearings and their poor lubrication, the bearings of this motor have been designed with special reference to these points. The armature bearings are of the following dimensions: Pinion end, three and one-fourth inches by eight and three-fourth inches; commutator end, two and seven-eighth inches by six and three-eighth inches. They are designed and built on the "outboard" plan. The support for the upper half of the lining is cast as a part of the upper half of the frame, and between the inner end of the outboard bearing and the motor frame there is a large cored recess. This space is utilized for a combination thrust-collar and oil-guard, which is funnel shaped, and extends through the motor frame into the cored recess, where it acts as an oil-guard, three inches in diameter. The support for the lower half of the lining is a cap, bolted to the upper half, but not inclosing the lower half of the oil-guard. This allows free egress to the lubricant after it has passed through the bearing, and makes it impossible for it to work through into the motor frame. Either oil or grease may be used in the bearings. The lower boxes, or oil-wells, are provided with felt wicks, which wipe the shaft through holes cut in the linings. For the armature bearings, there are two of these wicks on the pinion end and one on the commutator end. For each of the axle bearings there are two wicks.

The coils are wound on cast spools thoroughly insulated with asbestos, mica and paper and wound with copper ribbon insulated with asbestos. A covering of heavy duck drawn together and sewed after the spool has been wound forms a perfect mechanical protection for the winding. As in the G. E. 1,000 motor, the upper and lower field connection is made on the outside of the motor, and all leads to the car are brought out on the front end. This has been found convenient in the car wiring and opening of the motors.

The armature is similar in construction to the G. E. 52 armature. It is small and compact, being 14 inches in diameter, with a spread of 12 inches, and has 33 slots. It is ironclad, the core being built up of well annealed laminated disks assembled directly on the armature shaft. In assembling the core, three sets of spacing blocks are used, providing three ventilating ducts. This form of construction is similar to that of the G. E. large generator armatures. There are 33 triple coils, each coil composed of three separate coils bound into a compact single unit. The separate coils are wound with either two or three turns per coil, as may be specified, the three-turn winding being standard for ordinary service.

This method of winding is a distinct advantage in the matter of armature repairs, there being comparatively few coils to look after, while the construction admits of a substantial insulation of high quality, insuring immunity from repairs. A special effort has been made in the design of this motor to have the armature as light as possible without detracting from its electrical merit and efficiency; a light armature having a small inertia presenting special advantages in starting and braking.

The standard gear ratio is 3.72 with a taper bore pinion having 18 teeth, and a cast-steel gear having 67 teeth, and a face of five inches. A two-motor equipment with this ratio will propel an 18-ton car about 26 miles an hour on a level track. For heavy haulage work a lower speed gear ratio may be used, giving a slower speed and correspondingly increased tractive effort. A higher speed gear ratio may also be used, giving an increased speed and correspondingly decreased tractive effort.

The commutator is similar in construction to the G. E. 1,000 and has 99 segments. The segments are of hard, drawn copper two inches deep, allowing a wearing depth of one inch. The brush-holders are staggered to prevent the wearing of ridges in the commutator, and each holder contains two radial brushes two and one-fourth inches long by one and three-fourth inches wide by five-eighths of an inch thick.

The standard G. E. 57 motor is adapted to either the nose or the yoke suspension, as in the G. E. 1,000 or the G. E. 52 motor. The motor can be fitted for side-bar suspension, but this necessitates a slight modification of the frame. The yoke suspension is recommended, as with this suspension the weight of the motor is carried on springs placed on the side frames of the car trucks. Lugs are cast on the upper half of the motor frame, to which the suspension bar is bolted. For inspection or repairs, the lower half of the motor can be swung down into the pit without disturbing the upper half. When the motor is mounted on 33-inch wheels the clearance between the bottom of the motor and the top of the track rail is three and one-fourth inches. The clearance between the bottom of the gear case for 67-tooth axle gear and the top of the track rail is four and one-eighth inches.

The G. E. 57 motor without gear or gear case weighs 2,632 pounds. With 67-tooth gear and gear case the weight of the motor complete is 2,972 pounds.

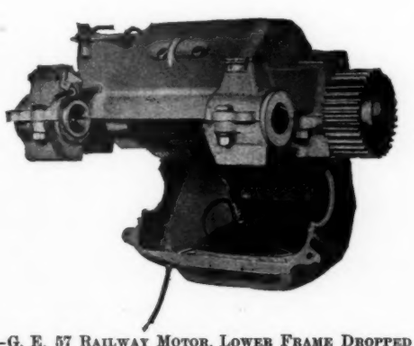


FIG. 3.—G. E. 57 RAILWAY MOTOR, LOWER FRAME DROPPED SHOWING ARMATURE IN POSITION.

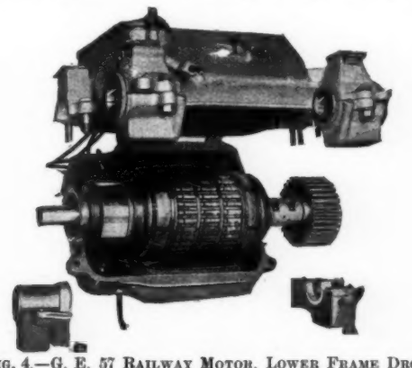


FIG. 4.—G. E. 57 RAILWAY MOTOR, LOWER FRAME DROPPED SHOWING ARMATURE READY FOR REMOVAL.

Novel Electrical Effects at the Trans-Mississippi Exposition.

The electrical exhibit at the Trans-Mississippi and International Exposition at Omaha, Neb., will reveal many interesting features. Mr. Luther Stieringer, of Schnectady, N. Y., who designed the electrical fountains at the World's Fair, has been engaged as consulting electrical engineer of the Trans-Mississippi Exposition. The illumination feature of the exposition will include some magnificent electrical effects.

Prof. R. B. Owens, of the University of Nebraska, commissioner for the electrical section of the exposition, has secured the following exhibits: Direct-current, single and multiphase motors for stationary use, railway apparatus, electric mining apparatus, high-frequency and high-potential apparatus, telephone and telegraph apparatus, electric wire-making machinery, electro-chemical processes for the reduction of metals, searchlights, electric supplies and specialties. Professor Owens was a member of the jury of awards at the Columbian exposition, and his relations with electrical manufacturing interests and electrical engineering have served to make his efforts and wide acquaintance of much usefulness in securing exhibits and enlisting the attention of manufacturers and inventors in all parts of the country.

Application has been made and space assigned to the following electrical firms: The Walker Company, the Fort Wayne company, the General Electric Company, the Western Electric Company, the Wagner Electric and Manufacturing Company, the Crocker-Wheeler Electric Company, the Okonite, Company, Ltd., the Cutter Electric and Manufacturing Company, the Keystone Electrical Instrument Company, the Cutler-Hammer company, Elmer G. Willyoung & Company.

Electrical Review

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EDITOR:
CHARLES W. PRICE.
ASSOCIATE EDITOR:
STEPHEN L. COLES.

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WESTERN OFFICE:
CARL E. KAMMEYER, Representative,
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Telephone-Harrison, 475.

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HENRY W. HALL, Representative,
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Special Notice to Advertisers.

***CHANGES** for advertisements must be in this office by Friday noon for the following week's issue.*

***NEW ADVERTISEMENTS** should be in the office not later than Saturday noon to insure publication on the following week.*

NEW YORK, OCT. 20, 1897.

CONTENTS.

	PAGE
Views, News and Interviews	183
Street Railway Men in Niagara Falls	183
Modern Compressors for Air-Braking	186
Death of W. H. Forbes	186
Electric Light Flashes	186
A New Electric Railway Motor	187
Trans-Mississippi Exposition	187
Is There To Be a Rubber-Covered Wire Pool	188
Lord Kelvin Sails for Home	188
Personal	189
Late News	189
An Advance View of the Street Railway Convention	189
The Telephone System in the New Astoria Hotel	189
The Electrical Exposition	189
Advice to Convention Delegates	189
Modern Construction and Maintenance of Electric Lines	190
Waste Power at the Shore	190
Recording Wattmeters for Street Cars	191
A Remarkable Telegraph Line	191
Permanent Aerial Weather Stations	191
From Cincinnati to Cleveland by Trolley	191
Electric Railways	192
Literary	192
Trolley Tracks on the Brooklyn Bridge	192
Telephone News and Comment	193
Western Union-Bell Telephone	193
"P. & B." Products in Foreign Lands	193
Advance Information	194
Kindred Interests	195
The Telephone Reduces Railway Travel	195
Electrical Patents	196
Chicago News Notes	196

INDEX OF ADVERTISERS.

COVER PAGES.

	PAGE
Abendroth & Root Mfg. Co., boilers	xviii
American Electrical Works, insulated wire	i
Babcock & Wilcox Co	xviii
Bunnell & Co., J. H., dry batteries	i
Clonbrock Steam Boiler Co	xviii
Columbia Incandescent Lamp Co	i
Crefeld Electrical Works	i
Crocker-Wheeler Electric Co	i
Day's Kerite, insulated wire	i
Dixon, Jos., Crucible Co., belt dressing	i
Electric Appliance Co., supplies	i
General Electric Co	xvii
Goldmark & Wallace, "Koch" dynamo brushes	i
Imperial Porcelain Works	xviii
Iron Clad Rheostat Co	i
Leffel & Co., Jas	xviii
Lombard Water-Wheel Governor Co	xviii
McKenney & Waterbury	i
Newton Appliance Co	i
New York Insulated Wire Co., Grimshaw wires and cables	i
New York & Ohio Co	i
Okonite Co., insulated wires and cables	i, xviii
Partrick & Carter Co., electrical supplies for housework	i
Partridge Carbon Co	i
Safety Insulated Wire and Cable Co	ii
Stirling Co., water-tube boilers	xviii
Thayer & Co	i
Van Nuis, C. S	i
Vulcan Foundry Co	xviii
Willard Battery Co., storage batteries	i

INSIDE PAGES.

American Impulse-Wheel Co	x
American Bell Telephone Co	xv
American Electric Telephone Co., long-distance telephones	xv
Andrews-Ryan Co., telephone engineers	xv
Armorite Interior Conduit Co	viii
Baker & Co., platinum	xi
Ball & Wood Co., engines	xi
Berlin Iron Bridge Co	xvi
"Big Four" R. R	x
Bogart, A. L	185
Brill, J. G., Co	xvi
Brixey, W. R., Day's kerite wires and cables	x
Buckeye Electric Co	xiii
C & C Electric Co	vi
Central Electric Co., electrical supplies	iii
Chicago Edison Co	ix
Connecticut Pipe Mfg. Co	xvi
De Veau & Co., telephones	186
Diehl Manufacturing Co	v
Dixie Company	186
Duval, E. S., Jr., patents	186
Dyer & Driscoll, patent solicitors	186
Eastern Electric Cable Co	xi
Electrical Mercantile Agency	xi
Electric Storage Battery Co	iii
Empire China Works, porcelain specialties	xvi
Eppinger & Russell Co., Valentine subway electrical conduit	xvi
Eyanson & Armpriester	xvi
Faraday Carbon Co., carbons	x
Farr Telephone & Construction Supply Co	xv
Forest City Electric Co	xvi
Fort Wayne Electric Corporation	xiii
Gordon-Burnham Battery Co	xiii
Hamilton Publishing Co	186
Hudson Iron Co.—for sale	185
India Rubber and Gutta Percha Insulating Co	xvi
Interior Conduit and Insulation Co	vii
International Correspondence School	xi
Jewell Belting Co	xii
Keystone Electrical Instrument Co	ix
Lehigh Valley Creosoting Co., creosoted lumber	xi
Locke, Fred. M	xiii
Lockwood Long-Distance Telephone & Telegraph Co. of America	xv
Lynn Incandescent Lamp Co	xiii
Manhattan Optical Co	xiii
Marshall, Wm., condensers	186
McIntire Co., The C	xiii
McLennan & Co., K	x
New England Engineering Co	xii
New York Telephone Co	185
Novelty Electric Co., supplies	xi
Okonite Co., insulated wires and cables	iv
Orient Electrical Co	186
Ostrander, W. R., & Co., supplies	186
Pacific Electric Co	xi
Paiste H. T., Co	xi
Phillips Insulated Wire Co., wire	x
Reisinger, Hugo	x
Ritchie, E. S., & Sons	ix
Rodrigues, M. R	xvi
Roebling's Sons Co., John A., bare and insulated wire	viii
Rossiter, MacGovern & Co., for sale, motors	ix
Royce & Marean, electrical supplies	xi
Safety Insulated Wire and Cable Co	185
Sawyer-Man Electric Co	ix
Schiff, Jordan & Co	x
Siemens & Halske Electric Co. of America	ix
Solar Carbon & Mfg. Co	xv
Stanley Electric & Mfg. Co	vi
Sterling Supply & Mfg. Co	xvi
Tabor & Mayer	xv
Viaduct Mfg. Co., telephones, etc	185
Warner Library	xiii
Washington Carbon Co	iii
Wedderburn, John, & Co., patents	186
Western Electric Co	xii
Western Telephone Construction Co	xv
Westinghouse Electric & Mfg. Co	v, viii
Weston Electrical Instrument Co., measuring instruments	x
White & Co., J. G., engineers and contractors	185

Electric lighting has been defeated in Hammondsport, N. Y., by a two-thirds majority. What is the matter with Hammondsport?

The need of electricity in certain branches of the traction service of roads now operated by steam is becoming more urgent, and although it is perhaps premature to predict any immediate revolution in steam road methods, the encroachments of electricity in that domain can no longer be denied.

It is to be hoped that the question of electric heating apparatus for street cars will be taken up at the Niagara Falls meeting of the American Street Railway Association. There are a number of types of electric heaters suitable for street cars on the market to-day, but electric railway managers, who are known to be eminently practical men, have been heard to remark from time to time that the efficiency of these heaters was not all that was to be desired. Manufacturers of apparatus of this kind must bear in mind that they are compelled by precedent and force of circumstances to compete with coal stoves. This involves the consideration of a number of questions which would not ordinarily occur to the average passenger, such as the cost of handling the coal stove in the matter of the supply of fuel and the removal of ashes, which are not present in the electrical problem. The suggestion made in the ELECTRICAL REVIEW about a year ago as to the proper location of electric heaters in street cars is also worthy of discussion. As they are placed now, a man is sure to be thoroughly warm in but one part of his body—that is his calves.

People who make a practice of suing street railway companies for damages for alleged bodily injuries are having a hard time of it these days. Several swindlers of this type have recently been caught and exposed in the West and South, and last week a similar case occurred in New York city. A Greek girl claimed that she had been thrown from a car operated by the Metropolitan Street Railway Company, causing her to sustain severe injuries to her spine and other parts of her body. She brought suit for the alleged injuries, and at the trial of the suit testified that she had been unable to take exercise since the accident, which occurred about a year ago, that her sight had been so affected that she could hardly bear daylight, and that she had frequent fainting fits. The attorney for the street railway company produced two photographs taken during the past Summer, in each of which the plaintiff identified her own picture. One showed her seated in a row boat with another girl on the lake in Central Park. The plaintiff was rowing. The other photograph was taken in the rear of her house while she was hanging out clothes. The girl also admitted that she had been to numerous excursion resorts several times during the past Summer. On hearing this evidence, the attorney for the plaintiff said he had been deceived by her and obtained permission to withdraw a juror. This resulted in the virtual dismissal of the action. The company had previously offered to settle the case, but the girl stood firm for $15,000 damages, which the company would not pay.

IS THERE TO BE A RUBBER-COVERED WIRE POOL?

An important meeting of manufacturers of rubber insulated wire was held at the office of Counsellor Jackson, 115 Broadway, Saturday of last week. Representatives of the leading companies in this field were present, and the question of pooling their interests was discussed at length.

There are about twenty companies engaged in this branch of the insulated wire business, and prices during the last few years have been so severely cut by competition that, according to the manufacturers, profits have entirely disappeared. It is with a view of reaching some agreement by which a reasonable business profit may be secured that this gathering was held.

No definite conclusion was reached, but other meetings will be held. Mr. Jackson is the attorney who has successfully organized the copper wire and other pools, and he is said to be quite hopeful of success in this instance.

LORD KELVIN SAILS FOR HOME.

Lord and Lady Kelvin sailed on the "Campania" for England last Saturday morning after a visit of nearly three months in the United States and Canada. He left delighted with his American visit, stating that he had made notes enough of new ideas to keep him thinking all the rest of his life, and expressed quite an interest in the wonderful development of electric traction. Before sailing, Lord Kelvin made two visits to Tesla's laboratory in New York city, where some new scientific results were shown to him. Lord Kelvin is respected and loved by every electrical and scientific worker in the United States, and all wish him a pleasant return voyage and many years of continued usefulness at Glasgow University.

The annual address of President McCulloch, of the American Street Railway Association, delivered yesterday at Niagara Falls, is presented in full in this issue of the ELECTRICAL REVIEW. He pays a marked tribute to electrical science for its great assistance in the field of traction, and gracefully compliments the supply men and the manufacturers. The work of the Accountants' Association is also commended. The address is brief, pointed, and in every way admirable.

The communication on another page in this issue of the ELECTRICAL REVIEW by Mr. T. J. McTighe on "Permanent Aerial Weather Stations" will be found to be of great value. We believe the idea of captive balloons provided with a constant supply of gas is new, at least for this use. The Government Weather Bureau should try an experiment of this kind.

PERSONAL.

Mr. E. C. Foster, general manager of the Lynn & Boston Street Railroad Company, was among the metropolitan visitors last week.

Mr. Thomas F. Clark has been elected vice-president of the Western Union Telegraph Company, to succeed Mr. John Van Horn.

Dr. Louis Duncan, of Baltimore, has been appointed consulting engineer for the electric railway system now being installed by the Capital Traction Company, of Washington, D. C.

Mr. Frank S. De Ronde, of the Standard Paint Company, New York, attended the meeting of steam railroad men, in Denver, last week. The convention was very largely attended and considered a very important one.

Dr. Herbert G. Torrey, who has been intimately associated with the Magnolia Metal Company for the past eight years, has severed his connection with that company and has entered the service of the Stirling Metal Company, of Stirling, N. J., as consulting expert.

Lord and Lady Kelvin inspected the new buildings of Columbia University, on Morningside Heights, New York city, on Thursday last, under the guidance of Professor Woodward, of the department of mechanics. Lord Kelvin was highly pleased with Columbia's facilities and equipment.

Mr. Frank Laughlin, the energetic young manager of the Solar Carbon and Manufacturing Company, of Pittsburgh, was in New York last week, feeling justly pleased over a two-car order for carbons recently received. The order came after a severe test by the customer of the product of the Solar and the National Carbon Company.

Mr. Henry C. Payne, the street railway magnate and a member of the Republican National Committee, was prostrated in his office at Milwaukee, Wis., on October 16, by an acute attack of indigestion. He was unconscious for some time. He is said to be subject to these attacks, and it is feared that this one will prove more serious than former ones.

Mr. William T. Russell has resigned as superintendent of the Edison Electric Light Company, of Baltimore, and has accepted a similar position with the Northern Electric Company, of the same city, of which Mr. J. Frank Morrison is president. On his retirement, Mr. Russell's associates in the Edison company gave him a dinner, and presented a diamond stud to him.

Mr. Leonard F. Requa, general manager of the Safety Insulated Wire and Cable Company, of New York city, is the proud possessor of a very handsome oak and leather office chair, presented to him by his office staff. The occasion of the presentation was the tenth anniversary of the organization of the company, which Mr. Requa has so ably and successfully managed during the past decade.

Mr. George E. Pratt, the late secretary and general manager of the Hunt Air-Brake Company, of Pittsburgh, has severed his connection with that concern and entered the service of the Standard Air-Brake Company, of New York city, as special agent. Mr. Pratt was an earnest worker in the air-brake field, had a thoroughly good opportunity while in the Hunt company of becoming acquainted with the merits of Standard air-brakes. It is certain that Mr. Wessels is surrounding himself with representative men in the various branches of his company's business.

Mr. F. M. Pierce, president of the Pierce & Miller Engineering Company, of New York city, has recently returned from a tour around the world, during which he made many valuable connections for his firm. Mr. Pierce states that the observations he made while abroad lead him to think that American manufacturers will do a large European business in supplying equipment for electric railways. Mr. Pierce's company expects to secure its share of this growing trade, and has recently made new arrangements to take care of its rapidly growing business at home.

Col. Henry C. Davis, for several years president of the Electric Club, of New York city, is now residing in Philadelphia, and is the president of a large corporation engaged in railroading and coal mining. At the conclusion of Colonel Davis's presidency of the Electric Club, he was presented with a very handsome gold watch. It was a non magnetic repeater and was a particularly fine one. Recently on a crowded car on Lexington avenue, New York city, the watch was stolen, and although Colonel Davis has advertised quite extensively for its return "and no questions asked," he has not heard of it since.

LATE NEWS.

A receiver has been appointed for the Galveston City Railway, of Galveston, Tex.

Deputy Sheriff Williams has received an execution against the Spanish American Light and Power Company, consolidated, whose office is 113 Wall street, New York city, for $6,304 in favor of Francisco R. Guzman for the amount on 478 past due coupons.

A dispatch from Columbus, Ohio, on Monday of this week states that the Columbus Street Railway Company and Columbus Central Railway Company have agreed to consolidate; $3,000,000 is to be paid for the Central property and its indebtedness assumed.

It is expected that the dam and all hydraulic work on the plant of the Hudson River Electric Power Transmission Company at Mechanicsville, N. Y., will be completed by November 1. It is hoped that current will be supplied from the plant by January 1, 1898.

Russell B. Harrison's Road in a Receiver's Hands.

The Terre Haute, Ind., Street Railway Company, of which Russell B. Harrison is president, went into the hands of a receiver on October 18. Judge Jump was named receiver. The city tied up the cars because of non-payment of $5,000 taxes, and the receivership was the result. Mr. Harrison contends that a snap judgment was taken.

An Advance View of the Street Railway Convention.

[*From a Staff Correspondent.*]

NIAGARA FALLS, October 18—The beginning of the sixteenth meeting of the American Street Railway Association is marked by cool, crisp weather, and indications are that it will continue throughout the session, contributing toward bringing together an unusually large and enthusiastic body of men, representing both the vast street railway interests of America and the manufacturers who make railway equipments, cars, trucks, wire, generators, and all apparatus used in the field of transportation.

Mr. T. C. Penington, of Chicago, who is secretary of the association, has been here since Saturday morning, and has preliminaries as to arrangements of exhibits and entertainment matters well in hand. Mr. Penington said to me this morning, "I think we shall have at least 1,000 men at this meeting who are active in street railway matters. The exhibits are likely to be the most comprehensive in our history, and much interesting apparatus will be seen."

The registers of both the International Hotel and Cataract House are filled for the days of the meeting, and many prominent in the field reached here Sunday and to-day. Among them are Mr. Phillip W. Moen, general manager of the Washburn & Moen Manufacturing Company, of Worcester; Mr. H. T. Richards, of the Safety Insulated Wire and Cable Company, New York; Mr. Elmer P. Morris, New York; Mr. Edward Brill, of the J. G. Brill Company, Philadelphia, also Mr. G. M. Haskell, of the same company; Mr. J. B. O'Hara, editor *Western Electrician*, Chicago; Fred. R. Case, of Hoopes & Townsend, Philadelphia. The following gentlemen represented the General Electric Company: F. M. Kimball, Boston; L. D. Tandy, Schenectady; Mr. and Mrs. Caryl D. Haskins, Boston; Jno. S. Bradley, New Haven.

Among the convention arrivals on Monday were: W. J. Clark, Maj. H. C. Evans, John McGhie, T. C. Martin, J. E. Meek, Harold P. Brown, H. W. Ransom, all of New York; E. H. Heinrichs, F. M. Laughlin, Pittsburgh; T. Ahearn, Ottawa; President Robt. McCulloch and wife, St. Louis; W. J. Kelly, Columbus; John A. Brill, Philadelphia.

An advance delegation from Cincinnati is here and is determined to capture the next meeting for that city. Posters showing the exposition building, which they propose to offer for exhibitions, are to be seen in the hotel corridors and about the exhibition hall. On Tuesday a body of 20 citizens, headed by B. L. Kilgore, of the Cincinnati Street Railway Company, and R. P. Ernst, of the Cincinnati & Covington Railway, are expected to arrive from Cincinnati to add importance to the invitation, as the Cincinnati element fear that Detroit may get the honors.

S. H. GODDARD.

The Telephone System in the New Astoria Hotel.

Among a number of large contracts recently secured in the vicinity of New York by Mr. W. W. Bostwick, Jr., 38 Park row, New York city, who represents the Western Telephone Construction Company, of Chicago, in this territory, is that involving the telephone equipment for the new Astoria Hotel at Thirty-fourth street and Fifth avenue. The system comprises 77 telephones, a 40-drop switchboard and an 18-drop switchboard, as well as a number of detail parts to conform with the various systems. Of these telephones, 30 will be desk sets and the others will be various styles of wall instruments. Some of these are to be finished in wood, enameled in white, and the others in mahogany. The equipment will be the finest of its kind and of the best quality that can be turned out by the Western Telephone Construction Company. This new hotel is probably excelled by none in the world, and all the electrical appliances have been chosen for their efficiency. Another important contract recently secured by Mr. Bostwick is for one of the Western Telephone Construction Company's No. 1 improved metallic circuit switchboards of 100 drops for the new Columbia University on Morningside Heights, New York city.

The Electrical Exposition.

The Electrical Exhibition Company, of New York city, last week closed a lease for the Madison Square Garden for the Electrical and Kindred Industries Exposition, which will be held in New York city from May 2 to May 31, 1898. The lease includes the amphitheater, the arena circles, concert hall, assembly hall, and machinery hall in the basement, affording a total of over 100,000 square feet of floor space available for exhibits. This is considerably more space and better adapted for exhibition purposes than was possible to secure at the first electrical exposition held in New York in 1896. Mr. Marcus Nathan, general manager of the Exhibition company, has established his executive offices at 15 Cortlandt street, New York city. It is understood that the plans of the company, which, it is said, will result in giving the finest electrical exposition ever held, are progressing with satisfaction to all concerned.

Advice to Convention Delegates.

The friends of Mr. Charles A. Bragg, of Philadelphia, who attend the street railway convention at Niagara Falls, are requested to ask him for copies of a card containing the following sage advice:

"The buzzing of the trolley and the murmur of the Falls meet in equal combat all this week. The occasion will be jolly, and the number of the 'calls' will depend entirely on your 'cheek.' But do not make an error and fill your friends with terror by assuming that you are the only drop in the fluid that is flowing, or the 'wheels' will get to going—going much too swift and fast to ever stop."

MODERN CONSTRUCTION AND MAINTENANCE OF ELECTRIC LINES.*

BY WILLIAM BROPHY.

No one can deny that the best form of electric line construction is the underground system for the transmission of any form of electrical energy, except possibly the long-distance telephone system, for here induction and retardation as yet offers an insurmountable obstacle to the successful transmission of articulate speech over long-distance lines when any considerable portion thereof is placed under ground.

Electric lighting circuits in which is maintained a difference of potential of from one to 10,000 volts can be operated much better than when suspended in the air. The insulation of the underground cables and wires can be maintained at from one to 6,000 megohms per mile, a figure that can not be approached by any overhead line except where made up in the form of cables equally well insulated and protected by an outer covering of lead or some other equally durable material.

In the congested district of cities all electric wires should be placed under ground, as there is no excuse for maintaining them over head on poles in the streets, an obstruction to travel and a great hindrance to the fire department in the performance of its duties. Where an underground system is established, it should be one pure and simple, not a mongrel one, where the mains and feeders are in the electrical subways, and the house services distributed over the face and on the roofs of buildings or on unsightly distribution poles in order to reach the various customers. There are several objections to this method of construction, one of the principal ones being that it tends to reduce the absolute insulation resistance of the circuit. While the insulation of the underground wires and cables is all that can be desired, that of those portions of the circuits connected thereto that are over head is insulated in name only, and neutralizes the good effects of the underground portions of the circuits. All services from underground systems should be continued under ground until the interior of the building is reached.

Connections from underground circuits to points of consumption are made in various ways. In some cases subsidiary ducts are laid above the main ducts, in which are placed service wires, and from these connections are readily made to the buildings. In other cases service connections are made in the manholes, and from there run to the area under the sidewalk, and from these points the consumers are reached. In many cities the mongrel system before mentioned is used, in which case wires are led from underground conductors up the face of the buildings to the roofs, there to straggle from one point to another, providing they do not cross the streets. This method should not be tolerated anywhere. It has been the custom up to the present time to place transformers on the outer walls or roofs of buildings, leading the primary wires from the underground circuits to them. A much better plan would be to place them in the manholes or in pits specially prepared for them; this would not expose the high-potential primary wires to the accidental touch of firemen and others.

Unfortunately, underground systems as yet are the exception rather than the rule, and most of you for some time to come must deal with the question of overhead lines. In the majority of towns and cities these lines are running without any system or well-defined plan, the aim seeming to be to reach the desired point in the shortest, easiest, cheapest, and oftentimes flimsiest manner possible.

Undoubtedly, the best system of overhead lines are those supported on tall, shapely poles; on these should be fastened suitable cross-arms, with pins for support of petticoat insulators, the lines being fastened to these with tie wires. High and low-potential wires should never be placed on the same pole fixture or cross-arm. The pole brackets should not be fastened to the side of a pole between the cross-arms for the support of an extra wire; hard rubber hooks should not be screwed into the underside of a cross-arm for the support of another wire, when the arm is already carrying its full quota.

The owners of electric light and power lines make a pretense of using an insulating covering on them, but it is only a pretense; the so-called insulated wire used for overhead circuits of this character is but a flimsy, gauzy sham, so far as insulation is concerned. The insulation resistance of a high-potential overhead line should not be less than 15 to 20 megohms per mile, yet I have known them to drop to less than one-half a megohm per mile after a soaking rain, and it is rarely that they reach from 2 to 5 megohms under the most favorable circumstances.

Better by far to use wires without any such coverings and proclaim the fact that they are dangerous and must be left severely alone. But better still would it be to compel the use of the highest grade of insulation on all such wires and protect them from the action of the elements by a suitable mechanical covering, such as lead. The same high grade of insulation can be maintained in overhead lines as is obtained in those placed under ground, providing the same class of material is used. How long is the present style af overhead circuits to be tolerated, and who will be the first to insist on the much needed improvement is more than I can tell, but that such a change is needed, no one at all conversant with the subject can deny. Almost perfect insulation of overhead and underground line is possible, and all that stands in the way is the added expense and the apathy of the municipal authorities and the public, who good-naturedly suffer great abuse without even a murmur. Thousands of dollars are spent by municipalities for the best kind of fire and police telegraph apparatus, which, by the way, has been brought to such a degree of perfection that failure to give and receive the proper signals would be almost unknown were the lines on which they were placed so constructed as to convey an unfailing supply of electric energy from one end of the circuit to the other, instead of dropping it by the wayside, whenever a change in the atmospheric conditions takes place.

I will now take up the subject of line construction as it exists and is practiced in most municipalities. It is almost a universal practice to claim the top gain of all poles that have been erected for the use of the city or town in which they are located. This practice of placing municipal wires above all others was a very good one previous to the introduction of electric light and other high-potential wires, as it reduced the possibility of interference with them, due to the breaking of other lines. With the introduction of the electric light, the same policy was pursued from motives of economy.

This practice has often proved to be a most decided false economy, and if persisted in will yet lead to serious and disastrous results. It should be discontinued also for the sake of the employés of the fire-alarm department, as it exposes them to unnecessary and almost certain danger, owing to accidental contact with wires that may or may not be active, as they have no means of knowing their exact condition. Many deaths and injuries have resulted from this cause, and I fear there are more to come. In my own city some weeks ago one of the fire alarm linemen received injuries which did not result fatally, yet bid fair to leave him a physical wreck for the rest of his life.

Roof construction is one of the things that should be avoided in the fire or police telegraph system, because it is not easily controlled; it can not be readily inspected; it can be easily tampered with, through accident or design. When exposed to coal gas from chimneys, galvanized iron wire is quickly attacked thereby and soon destroyed. One rusty, unsoldered joint will often offer more resistance to the passage of the current than all the instruments in the circuit. Above all things, bare, uninsulated loops should be avoided in circuits; running such loops should be looked upon as a criminal act, because the instruments contained thereon are liable to be rendered useless at any time by being accidentally cut out.

The time when these lines should be constructed of uninsulated iron wire has long since passed, and it is the duty of every superintendent to so inform the proper authorities, and it is their duty to furnish the means to make the necessary change or bear the consequences. Copper wire covered with the best grade of insulation, and that in turn inclosed in a covering that will protect it from mechanical injury and the action of the elements, is the cheapest in the end, as it reduces the cost of producing the necessary electrical energy and insures the correct working of the system at all times; and if every mile of these lines could be placed under ground, so much the better; at any rate, all that can should be so placed, as underground electrical construction and operation has long since passed the experimental stage. It must be discouraging to the manufacturers of modern fire and police alarm apparatus to hear of repeated failures of the same, when from 85 to 98 per cent of them are due to line troubles.

In conclusion, I contend that the present form of line construction for fire and police systems is a relic of barbarism and its continuance a crime against the public, because it invites almost inevitable failure at times when such failures mean the unnecessary loss of valuable property, the spread of flames beyond the ability of the department to cope with them, and, worst of all, the loss of human life.

* Abstract of paper read before the Mayors' Convention, Columbus, Ohio, October 1, 1897.

Waste Power at the Shore.

[*From the Hartford Post.*]

When the calculator at the Edison Convention at Niagara Falls made his little comparison of the power of the great cataract to all the energy contained in the mine output of the world, he surprised his hearers, but none of them disbelieved his statement. What he said was that all the coal mined daily in the world would be about sufficient to pump back the water that runs over Niagara every 24 hours. (See ELECTRICAL REVIEW, September 29.)

Every one knows that but a small percentage of the energy of a mass of coal can be utilized by the best steam engine or steam pump, but the statement about Niagara Falls is none the less one to set intelligent persons thinking. If the energy of Niagara is so nearly equal to the best that can be derived from all the coal output, it is so clear as to require no demonstration that the greatest forces of the world are as yet unharnessed. Torrents with the potential of Niagara are not common, but there are hundreds of great water powers, and the harnessing of these is a fit subject of study for the engineer of great problems of motive power of the future.

But greater than the power of all the hundreds of water powers, heretofore too remote to be harnessed, but a possibility in power problems now that the transmission of electricity is beginning to be understood, is the greatest of all natural forces, the sea. It has been the dream of centuries that the ocean, with its enormous forces, might be made some day to use these to the advantage. Among the earliest of experiments was the tide mill which was to be found all along the New England coast a century ago, but this was a feeble and faulty form of utilization. It simply placed its wheels in the current and allowed the flowing tide to turn it. Where the tide mill used 10 horse-power hundreds more went to waste. Where the tide mill was operated by the sluggish run of water into some small creek, the electrical engineer of to-day has the whole power of the ocean to use if he can learn the secret of handling it.

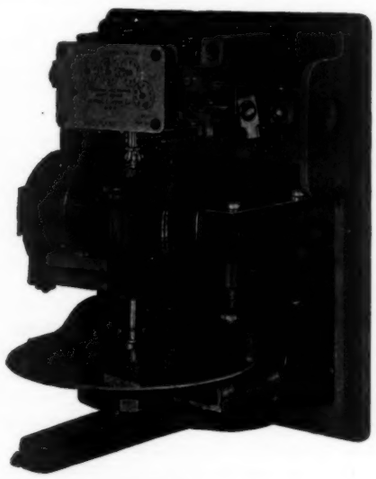
It does not seem too much to expect that the method of using the greatest force of nature, one beside which the torrent of Niagara and the coal output of the world are trifling, will be an open book before the world is a quarter century older.

The problem of future supply of energy for operating railroads and factories can not wait for the day when the coal supply shall be inadequate. Some greater and constant power will be found as surely as the discovery of the coal mines came when the fear of destruction when all the forests should have been burned up was at its height.

A company has been formed for the purpose of building an electric road from Amherst, Mass., to Northampton. F. S. Coolidge, of Fitchburg, is the leader in the enterprise.

Recording Wattmeters for Street Cars.

The adoption of more careful and accurate methods in street railway work is typical of the universal struggle for economy. The advantage of exact measurement of station output has long been recognized, and the requisite meters provided, but to record the ever-varying energy used on a car traveling over all conditions of road involves difficulties almost insurmountable. In the Thomson recording wattmeter for street railway service, however, the General Electric Company claim to have overcome all the obstacles. The new meter which has been placed on the market after a number of years of experimental work, is intended for installation in the car, like a cash register. It records the actual energy used by the car. A few trials determine the proper energy consumption per car per trip under various conditions of track and traffic. Subsequent readings of the meter determine at once if energy is carelessly wasted, and thus serve as an effectual check on the motorman and condition of the motors.



FIGS. 1 AND 2.—RECORDING WATTMETER FOR STREET CARS.

Well authenticated data prove that meters on lighting circuits increase the lighting capacity of the station by nearly 30 per cent; that is, 30 per cent of the light used, when the contract plan is followed, is generally wasted. Many railway managers agree that the average waste due to carelessness of the motorman amounts to not less than 20 per cent of all the energy generated. The economy, therefore, which will be induced by the use of street car motors will mean a saving of half of the average waste, or ten per cent of the total energy generated. The profit from such economy is twofold. It saves, first, the cost of coal and water necessary to generate one-tenth of the total energy output of the station; and second, it increases the receipts by increasing the car capacity without enlarging the station, or, in other words, enables the station manager to operate 10 per cent more cars without increase in the station equipment.

Car meters used in connection with station meters supply a beautiful system by which the detailed and combined efficiencies of a station are directly obtained, and an account given of the energy developed by every pound of coal consumed in the station. The adoption of such a system will, by necessity, increase the efficiency of any station under intelligent management, since it reveals and locates, with unfailing accuracy, any causes of wasted energy.

The simple motor construction of the car meter, as shown in the accompanying illustrations, is similar to that of the other forms of Thomson recording wattmeter, but new conditions, imposed by the rough service, have been met by the careful design of the rotating parts. Unavoidable vibration, due to rough tracks, demands a low drop in the armature in order that contacts may not be injured by sparking. High torque is also a requirement, so that heavy brush pressure, insuring perfect contact, can be used. The sudden and wide vibration of current requires a meter that will start quickly and slow down as soon as the current diminishes. The General Electric Company claim high accuracy for its new car meter, and ability to withstand severe and continued use on the roughest tracks. The meter is now made for 500-volt circuits, in sizes for 25 or 50 amperes, with a liberal provision for overloading.

A Remarkable Telegraph Line.

One of the many remarkable things in Australia is the overland telegraph from Port Darwin to the south of the continent, which was completed in 1872. Almost the whole 2,000 miles of its length were through uninhabited country—much of it a waterless desert. The wooden poles were prepared at the nearest available places, but some had to be carried 350 miles, while the iron poles were taken an average distance of 400 miles by land. Over 2,000 tons of material had to be carried into the interior, and the total cost was $1,850,000.

Electric Transmission in California.

The San Gabriel Power Company, of Azusa, Cal., has advertised its readiness to contract to deliver power and current for lighting in Los Angeles and surrounding towns by February 1, 1898.

PERMANENT AERIAL WEATHER STATIONS.

SUGGESTION OF A PLAN FOR ELECTRICALLY REPORTING WEATHER CONDITIONS DIRECT FROM THE CLOUDS.

TO THE EDITOR OF ELECTRICAL REVIEW:

I have been much interested in the work, occasionally noted in your columns, which has been begun at the Blue Hill Observatory; namely, the observation and study, at high altitudes, of air currents, temperature, humidity, electric conditions, etc. Much credit is due the professors at Blue Hill, as also to Mr. Wm. Eddy, of Bayonne, N. J., for their painstaking methods and perseverance in a line of investigation which is likely to place the whole system of climatology on a more exact basis and throw much needed light on the forecasting of the weather. This, to-day, is little better than guesswork.

The weather bureau is an admirable institution so far as it announces the probable movement of storm centers and locates areas of high and low pressure. These are actual realized surface conditions and only need telegraphic help to become weather forerunners. But when it comes to reliable forecasting, the system is at fault for want of knowledge of what is going on in the atmosphere at high elevations. A common failure is the announcement, for example, that the wind will be steadily west or northwest, and suddenly it becomes east or northeast and chills us to the marrow. Then the bureau proceeds to explain by means of a suddenly developed and unforeseen area of low pressure which knocked the wind forecast to smithereens. But why was it not foreseen? There was a cause for the change, and a cause for the low pressure, but the causes were recognized only by their effects, and one is reminded of the old adage about hindsight and foresight.

The forecasting system never can be reliable till we have proper apparatus and have studied extensively the conditions prevailing high up above the earth's surface. The Blue Hill and the Eddy kites are demonstrating this little by little. Their principal drawback is the kite itself, which, though infinitely better than its schoolboy prototype, yet lacks one essential quality in being too uncertain and too dependent on the condition of the wind. In times of comparative calm, or in severe storms, it can not be used. These, however, are the very times when we need the observations taken aloft, to be able to tell what is in store for the morrow.

It occurs to me that a very systematic and perennial study of the upper air conditions could be pursued with the proper instrument sustained, say at the height of one mile, by an anchored balloon, of very moderate size, connected electrically to recording instruments at surface, and continuously sustained by being *supplied with gas as required*. The anchor rope could be built up of a number of insulated wires for the circuits, and a core of fine steel tubing connected above to the balloon and below to a pump supplied with hydrogen or other gas. Thus the contraction due to the initial ascension into cold regions could be compensated by pumping, as also the loss of gas at all times, caused by exosmose or leakage. Steel tubing can be had nowadays drawn down to any size wanted, even a bore of one-half millimetre or less being obtainable commercially. Such a rope would weigh but little more, and present no more wind surface than the rope required for a group of kites. A mile of it, and the desired indicating instruments, would be well within the lifting power of a very moderate-sized balloon. A spherical balloon, 12 feet in diameter, should have a lifting power of about 60 pounds, and remain up so long as it is kept inflated.

With such a weather station right in the clouds to-day, above them tomorrow, below them next day, or in the clear empyrean, a year's record of temperature, humidity, direction of wind, etc., and a coincident record of conditions at the earth's surface would develop laws which would revolutionize the whole system of forecasting and elevate it into the ranks of exact science. T. J. MCTIGHE, E. E.

New York, October 12.

From Cincinnati to Cleveland by Trolley.

The Cleveland, Medina & Southern Electric Railway Company, of Cleveland, Ohio, with a capital stock of $750,000, has been incorporated by F. C. Goodman, Joseph W. Roof, W. P. Hackney, A. R. Gibson, George R. McKay, Francis C. McMillin and Joseph H. Storer. The line as proposed will be the longest of the kind in the world, and is to traverse the State from Cleveland to Cincinnati. It will pass through the following counties: Cuyahoga, Medina, Wayne, Ashland, Richland, Knox, Licking, Franklin, Madison, Fayette, Green, Clinton, Warren, Clermont and Hamilton.

Electric Railways.

The Hillsboro, Tex., street car line has shut down for lack of business.

The Oakland Electric Railway is about to put in new boilers and dynamos in its power-house at Birmingham, Mich.

The Chicago corporation counsel rendered an opinion last week to the effect that the Chicago street cars have no right to carry mail.

The Fostoria & Tiffin, Ohio, Electric Railway will soon be completed. The old franchise and right of way have been renewed, and work will begin within the next 10 days.

The Hartford, Ct., Street Railroad Company will build a brick car house, 155 by 290 feet, one story, and brick carpenter shop, 102 by 153 feet, one story, at 38 and 40 Vernon street.

Since the Lake Street Elevated, in Chicago, began to use the Union loop regularly, business has become so lively that the board of managers found it expedient to appoint a superintendent of the loop.

At a rapid transit hearing in New York city last week an engineer of the General Electric Company submitted plans for equipping an underground road with a complete electric outfit for $7,845,000.

The Van Brunt Street and Erie Basin Railroad Company, of Brooklyn, N. Y., has made arrangements to substitute the trolley for horse-power. It is now the only road in Brooklyn which uses horses.

The Chicago City Council last week passed an order for the appointment of a committee to secure definite information from street railway companies to be used when application is made for 50-year extension of franchises.

The Dayton & Troy Traction Company, of Dayton, Ohio, a new electric railway company, capitalized at $50,000, has been incorporated by Frank M. Turner, G. C. Wise, A. G. Feicht, George H. Volker and William C. Ely.

The Battle Creek, Mich., Electric Railway, H. P. Kauffer, E. S. Roos, W. G. Howard and H. C. Reed, have sold their interests to New York capitalists. The Kalamazoo and Battle Creek railways will consolidate, and will build a $300,000 electric line, which will connect the two cities.

It is understood that the Columbus, Ohio, Street Railway will call in its old stock and issue preferred, together with common, the sale of which will raise money to pay for the Columbus Central Railway, whose stock will be retired. Holders of the present Columbus shares will be given some special subscription privileges.

The United Traction and the Consolidation Traction companies, of Pittsburgh, are said to be negotiating for consolidation. A number of the largest stockholders of the companies were in conference last week. There is reported to be good evidence that all the street railways of Pittsburgh and Allegheny will soon be under one management.

The contracts for the construction of a standard-gauge electric railway from Canyon City to Cripple Creek, Colo., have been let by the Canyon City & Cripple Creek Electric Railway Company, to Orman & Cook, of Denver. The road is to be 30 miles long, and must be ready for use March 20, 1898. The contract is for about $1,000,000.

It was reported last week that negotiations which have been pending for some months between the Brooklyn Rapid Transit Company and the Union Elevated Company, of Brooklyn, N. Y., have reached a point where an announcement of some form of an agreement may come very soon. The agreement is expected to work considerably to the advantage of Brooklyn Rapid Transit.

The Lorain, Ohio, Street Railway's annual report shows the following: The stock of the company is $200,000. It has bonds out to the amount of $200,000, but no current liabilities. The cost of the road was $350,901.51, and of its equipment, $61,788.72. The operating expenses last year were $27,079.13, and $3,160.88 additional was paid in salaries. The interest payments last year were $12,000. No dividends were declared. The gross earnings were $45,751.33. The total mileage is 5.64.

An electric car on the Waterloo & Cedar Falls Electric Inter-Urban Line plunged from a trestle work to the river bank, at Waterloo, Iowa, on October 11, and 14 persons were injured. It is considered wonderful that all were not killed outright. The car was running at 20 miles an hour, and carrying a load of workmen on their way to places of employment. There were 12 passengers and four employés of the road aboard. All the passengers were injured, but two of the employés escaped unhurt.

Charles A. Brown is plaintiff in a suit commenced a few days ago in Common Pleas Court to recover $20,000 damages from the Youngstown, Ohio, Street Railway Company, for permanent injuries alleged to have been received October 21, 1895, when he was in defendant company's employ. Damages are asked on the ground that while the plaintiff, who was standing on the top of a trolley car at Foster and Burke streets, repairing a line, the car moved and he was thrown to the ground, alighting on his hands and knees, sustaining permanent injuries to his wrists.

We understand from reliable authority, says the Boston *News Bureau*, that when the real estate, rails, electric equipment and other assets of the West End Street Railway Company have been thoroughly gone over and actual replacement valuations marked against every item, no appraisement can be had that will show less than par value for all the company's stocks and bonds. If this statement is borne out by the report of the railroad commissioners' experts, there should remain no question to further delay the union of the Boston Elevated and the West End, and in the end the property, both new and old, will stand the better for this delay and this investigation.

Corporation Counsel Flowers, on October 11, on behalf of the city of Detroit, Mich., began, in the Wayne Circuit Court, the long-promised suit to have the consolidation of the Detroit Railway with the Fort Wayne & Belle Isle and Citizens' railways declared invalid. In the bill of complaint the Corporation Counsel recites the fact that when the Common Council, in December, 1894, gave Albert Pack and Henry A. Everett a franchise for about 60 miles of streets, it was expressly stipulated that their company, the Detroit Railway, would not consolidate with the two old companies. Mr. Flowers said that he was thoroughly convinced that a consolidation had been effected.

A car on the Oregon City Electric Line was held up at Meddrum Station, four miles from Oregon City, Ore., on the evening of October 10. There were 35 passengers on the car, and two highwaymen went through the pockets of all of them, getting about $90. The motorman slowed down when he came to a switch at the station. One of the robbers jumped on the front of the car, and, with a revolver in his hand, ordered the motorman to stop the car, while the second robber climbed on the rear end. Conductor John Anderson stepped inside and quickly turned out the lights, but he was held a prisoner by the man on the rear platform, who stood guard with a revolver. A posse pursued the robbers when the hold-up was reported.

Justice Hirschberg, in the New York Supreme Court, Brooklyn, N. Y., recently rendered a decision against the Electro-Magnetic Traction Company, of Washington, D. C., whereby the company is denied the ownership of certain patents issued to Oscar A. Enholm, in whose name the patents had been issued. John J. Ashley, of Brooklyn, was the owner of the patent until 1894, when, he alleged in his complaint, the company became possessor of the patent through forged assignments and misrepresentations. The plaintiff sought to have the company restrained from the use of the patent. His petition was sustained, and it was further declared by the court that all assignments entered into were null and void, and that the title to the patents vested in John J. Ashley.

The annual report of the Herkimer, Mohawk, Ilion & Frankfort, N. Y., Electric Railway Company shows the following:

Gross earnings, $41,348; operating expenses, $19,957; net earnings, $21,391; fixed charges, $10,434; net income, $10,956; dividends, six per cent, $9,000; surplus for year, $1,956; total surplus, $14,286. The general balance sheet shows:

Assets—Cost of road, $232,835; cost of equipment, $107,900; cash on hand, $1,404; due by agents, $105; open accounts, $126; materials, etc., $563; total, $342,933. Liabilities—Capital stock, $150,000; funded debt, $150,000; interest, $3,750; loans, $23,500; accounts payable, $1,396; profit and loss (surplus), $14,287; total, $342,933. The length of the road is five and three-fourths miles. The rolling stock includes six motor cars and six other cars. The number of passengers carried during the year was 875,246. The 25 employés received $14,200 in salaries during the year.

George P. Smith, of North Tonawanda, N. Y, has secured permission to traverse the town of Niagara Falls, N. Y., with a trolley line. Mr. Smith has stated that he has ample capital behind him, and that the construction of the new line will be begun at an early enough date to insure its completion by July 15, 1898. He also says that the new road will have access to the central business section of Buffalo, and that it will be one of the best equipped trolley lines in America. The route of the present Smith line in North Tonawanda and to Buffalo will be used in the construction of the new road, while the route from the southern city line of Niagara Falls to the central part of the Cataract City will be as direct as possible. It is said that Mr. Smith and his associates now have a clear right of way from Buffalo to the city line of Niagara Falls and are confident that their application for a franchise over certain streets in the latter city will be favorably acted upon at an early date.

LITERARY.

The proceedings of the semi-annual convention of the Northwestern Electrical Association, held at La Crosse, Wis., July, 1897, have been issued in pamphlet form.

Two papers on "Unusual Uses of Photography," that will interest both amateurs and professionals, appear in the November *Scribner's*. The first one, on aerial photography, gives a number of views taken from balloons and kites, and describes the newest methods for sending up a camera on a kite string. The other paper deals with night photography, and is accompanied by some very remarkable actual night pictures.

Trolley Tracks On the Brooklyn Bridge.

A gang of men began work last Thursday night on the tracks for the electric cars which will cross the Brooklyn Bridge from Brooklyn to New York city. Work was commenced at the Brooklyn end. Sixty-pound rails will be used. The pillars at the New York terminal will be removed and suspension girders will be substituted. The cars will arrive in New York city on the street level. It is expected that inter-urban service across the bridge will be commenced about December 1.

TELEPHONE NEWS AND COMMENT.

An independent company is seeking a franchise at Bath, N. Y.

The Bell Telephone Company, of Buffalo, has secured a franchise and rights of way through the streets of Bergen, N. Y.

The Central Union Telephone Company is preparing to install the selective signal system in several of its exchanges.

The Back Bay exchange, in Boston, of the New England Telephone and Telegraph Company, to be located at 208 Newbury street, will be opened on October 31.

The long-distance telephone has reached Fairmont, Minn., and it is thought facilities for talking as far East as Chicago, and possibly further, will soon be perfected.

The Wisconsin Valley Telephone Company will extend its line to Neillsville, Wis., as one of the representatives of the company has interested capitalists of that town in the enterprise. Work is to be begun immediately.

The American Telephone and Telegraph Company has completed putting in a station at Black River Falls, Minn., on the long-distance telephone. This city is now in direct communication with Chicago, New York and Boston.

The Bell Telephone Company, of Kokomo, Ind., has commenced the construction of a line from Logansport to Indianapolis, taking in the towns of Peru, Walton, Galveston, Kokomo, Sharpsville, Tipton, Noblesville and intervening points.

The first extension of the long-distance telephone lines into the territory south of the Potomac River was formally celebrated on October 14. Messages were exchanged between Washington, D. C., and Manchester, Va., just across the river from Richmond.

The Valley Telephone Company, with headquarters at Saginaw, Mich., has asked the City Council for a franchise to put in a telephone system in that city, with rates of not more than $24 for business places and $15 for private houses, with connection with Saginaw and Bay City. Midland people are offered stock in the company.

The National Union Telephone Company, composed of Indianapolis capitalists, has been granted a telephone franchise by the City Council of Anderson, Ind. The company agrees to furnish the city all the telephones it needs at the city offices and agrees to give five per cent of the gross earnings to the city each year after 1899. The company will file a bond of $5,000 to have the plant in operation by February 1, 1898. P. A. McDonald, of Indianapolis, is the promotor of the new company.

The instrument output of the American Bell Telephone Company, for the month ending August 20, and for the eight months of the fiscal year to the same date, shows as follows:

Month ending August 20—

	1897.	1896.	Inc.
Gross output	19,198	12,042	7,156
Returned	7,105	7,030	75
Net output	12,093	5,012	7,081

Since December 20—

	1896-7	1895-96.	Inc.
Gross output	162,743	148,395	14,348
Returned	69,106	68,547	559
Net output	93,637	79,848	13,789
Total outstanding	867,486	756,384	111,102

The Erie Telegraph and Telephone Company has opened its long-distance telephone line in connection with the Cumberland Telephone Company between Memphis, Tenn., and Helena, Ark. At Memphis the line connects with the general long-distance system of the United States. All that is necessary to complete the connection with all points of Arkansas and Texas is the building of a line from Helena to Pine Bluff in Arkansas, and from Malvern, Ark., to Clarksville, Tex., in all about 260 miles of pole line. This line will probably be constructed during the Winter months.

The Chicago Telephone Company has just completed the extension of its party line, or private residence telephone system, to the entire south side, north side, and other residence portions of the city. This system was experimented with about two years ago, and has proved so successful that it has now been put into use in nearly all parts of the town that are considered to be desirable for residence purposes. The system consists of the bunching of four instruments on one circuit, bringing into use only one pair of wires and at the same time obtaining a satisfactory and cheap service. For 16 cents a day one of the subscribers on this line may connect with 14,000 homes in the city and call up friends in a territory 24 miles long and seven miles wide.

The Cumberland Telephone and Telegraph Company has been served with an alternative mandamus, requiring it to furnish W. T. Avery, a citizen of Memphis, Tenn., with a telephone in his residence at the rate of 50 cents per month, the rate charged for like service in Columbia, Tenn. The bill of complaint shows that W. T. Avery applied formerly on August 27, 1897, to the defendant company for telephone connections and facilities in his residence at the Columbia price of 50 cents per month, and on September 11 he received from the company, through its president, its refusal to comply with complainant's request. The case will be in the nature of a test case, involving the meaning of Section 11 of Chapter 66 of the Acts of 1885, which provides that in the State of Tennessee no telephone company shall furnish the same service to one locality at cheaper rates than to another locality.

The ELECTRICAL REVIEW has received from the Home Telephone and Telegraph Company, of Fort Wayne, Ind., a copy of its newest list of subscribers. The list is bound in pamphlet form, is furnished with a marginal index, and contains a classified alphabetical list of business houses and residences in Fort Wayne. The company states that its large and increasing patronage has compelled it to establish a second exchange in Fort Wayne, and it now operates two exchanges, known as Main and South. The book also contains a list of the principal towns in Northwestern Ohio and Northern Indiana, with which the Home Telephone and Telegraph Company has connections by means of a toll line system, which is being rapidly extended. The Home Company boasts that it operates the largest telephone exchange in the United States in proportion to the size of the city, and states that it has one telephone for every 30 inhabitants in Fort Wayne. The only unfavorable criticism to be made in regard to this telephone directory is the color of the cover, which is a flaming red and extremely trying to the eyes. Mr. George W. Beers, who is well known in the independent telephone field, is the president of the Home Telephone Company.

Western Union-Bell Telephone.

The United States Circuit Court of Appeals, on October 15, ordered a mandate to issue in the case of the Western Union Telegraph Company against the American Bell Telephone Company. This suit was originally brought several years ago by the Western Union company to recover heavy damages from the Bell company on account of a contract, by the construction of which the Western Union claims to be entitled to earnings of sub-companies in the Bell system.

The case was referred to a master, who submitted a draft report in which he decided against the Western Union. Counsel for the Western Union having found out what the report was to be, asked the Circuit Court for leave to dismiss the bill by payment of costs. The Circuit Court entered a decree allowing the company to do so, and the Bell company appealed to the Court of Appeals, which decided about two years ago that the Western Union had no right to withdraw its bill.

The case was then taken by the Western Union to the United States Supreme Court upon a petition for a writ of *certiorari*, but the Supreme Court denied the petition, and sent the case back to the Circuit Court of Appeals, which, on October 15, ordered a mandate to issue in accordance with its opinion filed two years ago.

The case now goes back to the Circuit Court for a disposition of the bill, and the Western Union will either have to allow the bill to be dismissed and finally settle the litigation, or be obliged to go on and have a hearing of the case on the master's report.

"P. & B." Products in Foreign Lands.

For the past six years the well known products of the Standard Paint Company, of New York city, have been exported in considerable quantities to the various European countries, where they have given universal satisfaction. The length of time required to have orders dispatched from this country, as well as the high tariff existing in Germany, has seriously interfered with the natural and logical increase of the business. The sales of the "P. & B." products have been especially large in Germany and Great Britain. The Standard Paint Company decided last January to adopt means by which their products would be more readily available to European markets. With that end in view, President Ralph L. Shainwald made a trip to Europe, and, after a thorough examination of the situation and conditions to be met, the decision was reached to erect a large and complete factory in the city of Hamburg, Germany. This factory is situated on the River Elbe, making it possible to receive all raw products and ship all finished goods by water to any part of the world without any other handling than that of water transportation.

The Hamburg factory will be ready to operate next month and will at that time accept orders for all the "P. & B." products used in the electrical industries. These include the "P. & B." electrical compounds, tape, armature varnish, and some grades of insulating paper. The sales office of the company will be in charge of the well known firm of Messrs. Allut Noodt & Meyer, at 33 Grimm, Hamburg.

The new factory will manufacture the "P. & B." products exclusively for the European market. The North and South American markets and all points more accessible from the United States will be supplied as heretofore by the American factory of the Standard Paint Company. Mr. Robert W. Blackwell, 39 Victoria street, Westminster, S. W., London, is the representative of the Standard Paint Company in Great Britain and for France, Belgium, Holland and the colonies.

The Standard Paint Company is certainly to be congratulated on an extension of its business which requires the establishment of a European factory. The "P. & B." products have been standards in the electrical field in the United States for many years, and it is only fair to state that their constantly-increasing use and ever-widening sales are due primarily to their inherent merits. The management of the company has been broad gauged and progressive, which is evidenced anew in the establishment of the Hamburg factory.

Daniel M. Steers, former manager of the Home Telephone Company, of Alexandria, Va., has been directed by Judge C. E. Nicol, of the Circuit Court, to turn over to R. F. Knox, receiver, all moneys and property of the company in his hands. Receiver Knox has been directed to pay certain debts of the company.

ADVANCE INFORMATION

New Electric Railways.

KANKAKEE, ILL.—An electric line connecting this place, Wilmington and Morris, 40 miles long, is projected. A franchise has been granted, and work must begin within two years.

PHILADELPHIA, PA. — Arrangements have about been closed for the extension of a trolley line from this place to Belmont Driving Park, near Narberth.

WASHINGTON, D. C.—Preliminary arrangements for constructing an electric railroad between this place and Gettysburg are progressing, and there is a fair prospect that the enterprise may be undertaken in earnest.

FREMONT, OHIO—The Toledo, Fremont & Bowling Green Electric Railroad people are thinking seriously of putting in a branch from this place to Port Clinton and connecting with the lake Summer resorts in this vicinity, after the Fremont-Bowling Green belt is finished, which line is now under construction.

NASHVILLE, TENN.—A charter has been granted to the Cumberland Mountain Railway Company, with a capital of $25,000. The incorporators are Bruno Gerut, A. I. Fry, P. L. Phillips, W. A. and Max Calditz. They propose to build a railroad from a point on the Cincinnati Southern in Scott or Morgan County to a point on the Nashville, Knoxville or Tennessee Central.

PORT HURON, MICH.—The City Electric Railway Company has been granted franchise to lay double tracks on Pine Grove avenue.

CHATTANOOGA, TENN.—The Chattanooga Electric Railway; work of connecting tracks across the Whiteside street bridge over Chattanooga Creek has been completed.

MORRISVILLE, N. J.—The Doylestown and Willow Grove trolley line is being rapidly pushed.

DAYTON, OHIO—The Dayton & Western Traction Company has awarded contract for the construction of electric line between this city and Eaton.

BALTIMORE, MD.—The Baltimore, Halethorpe & St. Denis Railroad Company have applied for incorporation, with Isaac H. Francis, Ferdinand Hahn, William Ingle, Ferdinand Deboy and Carville D. Benson, for the purpose of building an electric railway for connecting Halethorpe, St. Denis and other places with Baltimore. Capital stock, $100,000.

NEWTON, PA.—The construction of the trolley from this place to Langhorne is now progressing rapidly. The road is expected to be in running order by November 1. The officers of the road are: President, T. P. Chambers; secretary, George C. Worstall; treasurer, A. Chambers. Directors, George C. Blackfan, T. S. Kenderdine, E. F. Buckman, T. P. Chambers, E. Chambers, J. C. Hutchinson, W. T. Wright, George C. Worstall and Ashbel W. Watson.

ALBANY, N. Y.—The New Rochelle Electric Railway Company has been incorporated to construct a road eight miles long, with termini in New Rochelle, at Cooper's Corners, on North street; at junction of Pelham road and Davenport avenue; at Glen Island dock and Morgan street, and on Wingate avenue at the village line. Capital, $80,000. Directors, William T. Emmet, Charles Nutt, Samuel F. Swinburne and others, of New Rochelle.

PORTSMOUTH, N. H.—Portsmouth, Kittery & York Electric Railroad will be extended to Ogunquit next Spring. Preliminary surveys are now being made.

NEENAH, WIS.—It is thought that within 30 days the new electric road will be running from this place to Appleton.

AURORA, ILL.—A scheme is on foot to build an electric railroad along Rock River from Rockford to Dixon.

EAST LIVERPOOL, OHIO — The North Side Street Railway Company, with a capital stock of $10,000, has been incorporated.

BUFFALO, N. Y.—The State Railroad Commission has granted the Buffalo, Hamburg & Aurora Company permission to build its proposed electric road.

BALTIMORE, MD. — The Central Railway Company has closed a contract with the Consolidated Railway Company to furnish power for the operation of the Canton and Wolfe streets line, which will soon be placed in operation.

WILKESBORO, N. C.—An electric railway will be constructed from Wilkesboro to Taylorsville, N. C.

Electric Light and Power.

PALMYRA, NEB.—John E. Graybill, electrician, has been awarded the contract for a 200-light electric plant for W. L. Crider & Son, of this place.

SOUTH FORK, PA. — The South Fork Electric Light, Heat and Power Company, with a capital of $15,000, has been incorporated.

RANDOLPH, VT.—This village has voted unanimously to accept the proposition of the White River Electric Company to put in electric lights and granted a 10 years' franchise.

ATTICA, MINN.—Maplewood Electric Light and Power Company, of this place. Capital stock, $10,000. Directors, Frederick C. Stevens, Edwin T. Gay, Augustus A. Smith, Burley Smith and Nicholas Reading, of Attica.

HARTFORD, WIS.—Operations are now under way for the electric light plant, which will be in operation by January 1.

HAMBURG, N. Y.—Another electric light plant is to be established here.

MEXICO CITY, MEX.—The firm of G. & O. Braniff & Company, of this city, have just been awarded the entire contract for the electrical plant for the transmission of power from the Rincon Grande Falls, near Orizaba, to the three mills, Rio Blanco, Cerrilos and San Lorenzo, owned by the Compania Industrial de Orizaba. The capacity of the generating plant will be 2,000 horse-power, and there will be delivered the necessary power for the complete electrical operation of these three mills. This power will be transmitted over a distance of about 10 kilometres.

FULTON, N. Y.—It is reported that J. H. Case and T. D. Lewis have secured a controlling interest in the Fulton electric light plant.

SOUTH WHITLEY, IND.—A stock company has been formed at this place for the purpose of installing an electric lighting system.

MERRILL, WIS.—The offer of the Merrill Railway and Lighting Company to furnish 60 arc lights of 1,200 candle power each for street lighting was accepted at a yearly expense of $3,300. The work of putting them in will begin at once and will be completed in about two months.

GRAYSON, KY.—A movement is on foot to establish electric lights in this place.

SAN FRANCISCO, CAL.—Butte Electric Light and Power Company has been incorporated. Directors, O. T. Weber, James Price, E. M. Weber, J. W. Hartzell, San Francisco, and Richard White, Chico. Capital stock, $150,000.

GUTHRIE, KY.—An effort will be made at once to have electric lights at this place.

PAULDING, OHIO—The new electric light plant for this place is now in course of construction, and is expected to be in full operation by November 1.

ELY, MINN.—The city has put in an electric light plant, and is only waiting the arrival of an engine to start it up. Already over 400 lights have been contracted and wired for.

WEEDSPORT, N. Y.—The question of lighting the streets of this place with electric lights is being agitated.

BROWN CITY, MICH.—City Clerk may be addressed concerning electric light plant.

CARO, MICH.—S. F. Chase, president of Common Council, may be addressed concerning lighting of streets.

ST. PAUL, MINN.—City Clerk may give information concerning establishment of electric light plant.

PETERSBURG, VA. — An electric light plant is to be placed in the silk mills of John N. Stearns & Son.

SACRAMENTO, CAL. — City Clerk may give information concerning establishment of a municipal lighting plant.

ORTONVILLE, MINN.—City Clerk may be addressed concerning establishment of electric light plant.

WILLIAMSPORT, MD.—P. L. Lemon can give information concerning the erection of a municipal electric light plant.

MILAN, MO.—The Mayor can give information concerning construction of electric light plant.

COVINGTON, KY.—City Clerk may give information concerning electric light plant.

HURON, S. D.—The electric light plant is again in operation.

New Telephone and Telegraph Companies.

FRANKFORT, IND.—Within the next three weeks the new telephone line connecting Logansport, Monticello, Delphi, Flora, Frankfort and all the intermediate smaller towns will be completed. In all, there are 16 towns on the line. The wire will be connected with the Bell company's exchange office here, and the many small villages in central Indiana will be thrown into the same close communication enjoyed by the larger cities.

LINDEN, WIS.—The telephone line is completed as far as Blue Mounds, and will soon reach Mt. Horeb.

WASHINGTON, D. C.—Washington and Norfolk are now connected by long-distance telephone.

PERU, NEB.—A telephone franchise has been granted to W. P. Gardner & Company, for a period of 15 years. The franchise is so worded as to allow long-distance telephones to enter.

DEADWOOD, S. D.—The Dakota Central Telephone line has completed its system, connecting Aberdeen and Huron and intermediate points with Big Stone City. This gives connection with 37 stations.

GATESVILLE, TEX.—The Southwestern Telephone Company has men in the county securing right of way from Waco to this place. It seems there will soon be telephone connection with the outside world.

TROY, N. Y.—It is reported that the New York State Telephone Company will soon operate in this city and use Troy as its main office.

DENVER, COLO.—The Automatic Telephone Exchange Company has been incorporated. Capital, $100,000. L. Bradford Prince, Robert M. Force, W. M. Berge, George C. Preston, Joshua F. Grozier, John M. Browning and Edward Ring, incorporators.

PIN OAK, IOWA—The Pin Oak Telephone Company has been incorporated with a capital stock of $10,000. The line will run through Sageville, Durango, Cottage Hill, Rickardsville and O'Neil to Pin Oak. Directors are as follows: J. H. Waldron, of Pin Oak; Dr. Stuart, of Cottage Hill; J. P. Sweeny, of Holy Cross, and George G. Perry and E. T. Keim, of this city.

WASHINGTON, D. C.—The new telephone system in the Treasury Department has been completed, and has been tested by Assistant Secretary Vanderlip. It is now in operation.

Kindred.... ...Interests

A Special Electrical Post Card is being sent out by H. C. Spaulding, 178 Devonshire street, Boston, calling attention to the merits of the Manhattan inclosed arc lamps, for the sale of which he is New England manager.

De Veau & Company, 32–34 Frankfort street, New York, has just issued the eighth edition of its catalogue of telephone and electrical supplies. It is a very neat and well illustrated pamphlet of about 70 pages. The company is doing a large business in its line.

The Stanley Electric Manufacturing Company are working on one of the largest generators ever made in their Pittsfield, Mass., shops. It is 750 horse-power, and will weigh 160,000 pounds. The Renne avenue shops and the Clapp avenue works are both running extra time, with many orders.

Free Commutator Compound—The offer of the enterprising house of K. McLennan & Company, Marquette Building, Chicago, to send a free sample of Gale's commutator compound, is one that will attract every electrical man who has a commutator. See their announcement on page x in this issue, and send in the coupon and get an article of genuine merit.

The Holtzer-Cabot Electric Company, of Boston, have recently erected a building for the lighting plant for their factory at Brookline, Mass. The power is developed by two boilers and a high-speed engine, which drives three dynamos supplying power for all the motors driving the machinery in their factory, and also furnishing them the light for the entire plant. The electrical outfit is of their own manufacture.

Goldmark & Wallace, 29 Chambers street, New York, are the American agents for the celebrated Koch woven-wire dynamo brush. This dynamo brush, as generally known, is manufactured in Germany, and has been used very extensively for many years. The manufacturers are now furnishing Messrs. Goldmark & Wallace with a new form of brush, eliminating the aluminum tube, which permits a material reduction in the cost of producing these brushes. The features which have made this dynamo brush are the ease of contact, high conductivity and current capacity, the lightness of wear on the commutator as caused by friction or sparking, also that it is noiseless and has great durability.

The Standard Air-Brake Company again appears at another street railway convention. It was in evidence at the World's Fair in 1893, at the Atlanta Convention in 1894, Montreal in 1895, St. Louis in 1896, and now appears for the fifth year. Managing Director Wessels states that the Standard system is now in such desirable shape as to make it unnecessary to introduce any new features. The company still holds to its well known type of axle-driven compressors, which are furnished both in single acting and double acting. There are many hundreds of them in daily service in all parts of the globe. The prophecy that Mr. Wessels uttered three years ago has practically been verified, "Where e'er you go the wide world round, the Standard air-brakes will be found." Business this year is reported as being not only very satisfactory, but decidedly in advance of previous years, and while the Standard Air-Brake Company's foreign business has undergone considerable expansion since last convention, the business in the United States has also seen a decided increase. Numerous installations have been made East, West and South. It has required a great deal of determination and business ability for the company to maintain its position as the first in the field. One of the secrets of the Standard company's success is the indefatigable work which the general manager puts into "driving things." Associated with Mr. Wessels on the board of directors are several international bankers, and these combined names in the market place are a sufficient guarantee that all promises made by the company will be strictly carried out. Ever since its start the company's inflexible rule has been to pay spot cash for all its purchases. This has given them enormous advantages and enabled them to lay in raw material at such favorable prices as to admit of selling air-brakes on as low a basis as was consistent with a reasonable profit. The Standard Air-Brake Company's foreign representatives stand in the very front rank, and embrace such concerns as Messrs. Dick, Kerr & Company, Limited, of London; Bergische-Stahl Industrie, of Berlin, Germany, and Messrs. Noyes Brothers, of Sydney and Melbourne, Australia. The company will make a fine display of its apparatus in Niagara Falls, and in addition to having its latest motor compressor in operation in connection with its automatic controlling device, the company refers delegates to 30 of its air-brakes now in their third year of successful operation on the Niagara street division of the Buffalo Railway Company. These brakes have had considerable to contend with, especially in the Winter time, with the violent fluctuations in temperature, and slush and ice. Nevertheless, they have done very well, and are not only in active service, but apparently good for much longer life.

The Telephone Reduces Railway Travel.

In a recent interview, published in *The Outlook*, Hon. Chauncey M. Depew, president of the New York Central & Hudson River Railroad, discusses "Travel in America." Among other pertinent things said by this able observer is the following relating to the effect of the use of the long-distance telephone on travel by railroad:

"I met an old business friend who was in the habit of coming to New York from his distant home two or three times a month in the interest of his business. He told me that he no longer did so. He said that he found that he was able to carry on his business in New York by means of the telephone, which he used an hour or two every day, and which answered every purpose for direct face-to-face conversation. He pays for his telephone several hundred dollars a year—probably not more than his railway fares would cost him; but he saves four or five days' time every month.

"Our merchants have found out that it is possible thus to carry on business directly, almost as though face to face, by the use of the telephone, so that a majority of business transactions which do not require personal action, the signing of contracts or personal inspection may be now carried on almost as well over the telephone as by personal interviews. That, I think, is going more and more to lessen purely business travel. In the old days the country merchant felt obliged to come two or three times a year to New York, and the merchant who lived nearer to come perhaps once or twice a month, or even oftener. Now, unless he wants recreation and a pleasant trip for his family, it is no longer necessary to do that; and I think all the railways in the United States have noticed a falling off of purely business travel, due entirely to the telephone. The telegraph never curtailed railway travel. If anything, it increased it, just as letter correspondence did; but the telephone is practically a personal interview. It is immediate—on the spot—and in that respect differs from the telegraph or the mails. With this exception, I have no doubt that the general propensity of the American people to travel will continue; and it may be that the business man will take longer or more frequent excursions, now that he does not find it necessary to travel for business reasons, than he did when a railway trip was taken purely for business advantage."

It is said that the house of Dr. Siemens, the Berlin electrician, is known throughout Germany as "The Wonder of Wansee." It is fitted from roof to cellar with electrical appliances. The dining-room, kitchen and wine cellar are all connected by means of a miniature electric railway. In order to convey things from one room to another, the article required has only to be placed on a little car, a button pressed, and the car is almost instantly where it ought to be.

TELEPHONE SERVICE
in New York City is Far-reaching,
covering forty square miles and **20,000** stations;
Efficient,
the service never stops night or day, and the speed of operating is high;
Economical,
the rates are strictly proportional to the subscriber's use and begin at **$90 a year.**
NEW YORK TELEPHONE CO.,
15 Dey St. 252 Broadway, 115 W. 38th St.

THIS CO HAS BEEN MAKING
TELEPHONES
20 YEARS, NOT CHEAP BUT SERVICEABLE AND FULLY GUARANTEED.
CIRCULARS FURNISHED.
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THE
HUDSON IRON COMPANY.
Manufacturing Site for Sale.....
85 ACRES OF LAND—1,100 FEET TIDE WATER FRONT, 400 FEET DOCKED.
2 SLIPS, EACH 350 FEET DEEP.
TWO R. R. LINES.

The undersigned, permanent Receiver of the Hudson Iron Company, at Hudson, N. Y., offers for sale property as outlined above, in block or parcels to suit purchaser.

The docks are accessible to any vessel that can enter the harbor of New York.

Tracks of the N. Y. C. & H. R. R. R, and Boston & Albany R. R. run through the property.

Commodious office building and Fairbanks track scale of 50 tons capacity.

Shipping facilities by rail and water in all directions.

For manufacturing purposes, this property is unsurpassed by any on the Hudson River.

Shops of The Steel Tired Wheel Company, now in process of enlargement, adjoin the premises.

The Hudson Iron Company conducted business on this site for about 48 years, paying an average annual dividend of 12 per cent. The proceedings for its dissolution were voluntary, the company being entirely solvent, and the limit of its corporate life having been nearly reached.

FRANK H. STOTT,
Permanent Receiver Hudson Iron Co.
STOTTVILLE, N. Y.

J. RIDER CADY,
Counsel for Receiver,
10 So. Fourth St., Hudson, N. Y.

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WIRES AND CABLES FOR EVERY SERVICE.
For Underground, Aerial and Submarine use, "Safety" wires and cables have the indorsement of some of the largest users in the United States. Write for our booklet containing the experience of users.
THE SAFETY INSULATED WIRE & CABLE CO.,
225 to 239 West 28th Street, New York.
LEONARD F. REQUA, General Manager.

Electrical.... Patents.

[Specially reported for this journal by E. S. Duvall, solicitor of patents, Loan and Trust Building, Washington, D. C. Copies of any patent may be secured for 10 cents each.]

ISSUED OCTOBER 12, 1897.

591,240 Phase-adjusting method and means for alternating-current apparatus; O. B. Shallenberger, Rochester, Pa.

591,241 Electrical measuring instrument; O B. Shallenberger, Rochester, Pa.—A permanent magnet constituting the field-magnet of the instrument and provided with a pair of polar extensions, each in the form of a ring, said rings being placed side by side, parallel to each other and separated by an air-gap

591,242 Alternating-current electric motor; O. B Shallenberger, Rochester, Pa.—A rotary armature, an inducing circuit, and closed secondary circuit at an angle therewith but in inductive relation to the inducing circuit and to the armature, the said circuits having lines of polarization which intersect each other.

591,254 Watchman's time recorder; D. Hepp, Chicago, Ill.

591,262 Pneumatic and electric controlled brake; H. S. Park, Chicago, Ill.—A train-pipe and a brake cylinder, a valve device operated by variations of fluid pressure to apply and release the brakes, a normally closed exhaust port, or passage and electrical controlling devices, whereby the exhaust port or passage may be alternatively controlled by the fluid pressure, operated valve device, or by the electrical controlling devices

591,267 Alternating-current generator; C. S. Bradley, Avon, N. Y.—An alternating-current electric generator, provided with means for varying the rate of alternation, and adjusting devices to vary the product of capacity and inductance to produce resonance at the several rates.

591,268 Alternating-current motor; C. S. Bradley, Avon, N. Y.—An alternating-current induction motor, having a revolving element inductively related to a rotary magnetic field and inductively related to an auxiliary stationary circuit, including current-regulating devices.

591,300 Outlet box for electric wiring; W. Soons, New York, N. Y.—An outlet box for electric wiring, having within the box pillars or lugs for the support of a rosette or other insulation fixture some distance from the bottom of the box.

591,301 Alternating-current electric motor; W. Stanley, Jr., Barrington, Mass

591,314 Electric railway system; G. Westinghouse, Jr., Pittsburgh, Pa.

591,321 Lightning arrester and cut-out; C. Branzell, Ashland, Wis.

591,331 Electric switch; W. A. Drewett, Brooklyn, N. Y.

591,339 Railway telegraph; A. C. Frieseke, Floral Bluff, Fla.

591,343, 591,344 Indirect regulation of dynamo electric machinery; G. S. Dunn, East Orange, N. J.

591,345 Indirect regulation of dynamo-electric machinery; G. S. Dunn, East Orange, N. J.—Consists in supplying the armature with a constant current, supplying the field from a source of energy separate from that which supplies the armature, and varying the field by varying the effective electro-motive force in the field-circuit simultaneously with the speed of the armature of the machine to be regulated.

591,365 Magneto-electric generator; J. A. Williams, Cleveland, Ohio.—A pole-piece consisting of a plate cut, stamped and formed with the lower edge slitted, folded upward and with the outward bends forming seats for the permanent magnets.

591,369 Illuminated electric sign; G. K. Burleigh, Northfield, N. H.

591,376 Signaling on railways; A. C. T. Bond, London, England A railway signal comprising two rails and a return; batteries connected, respectively, with the rails and the return; contacts for rendering either of the batteries inoperative and a lever between the contacts for operating them, together with a cab electrically connected with the rails and the return, and carrying signal devices in the electrical connections.

591,395 Magnetic coupling; T. J. Fay, Brooklyn, N. Y.

591,426 Electrical protector; C. A. Rolfe, Chicago, Ill.—A protector comprising a cut-out for removing the instrument from the line; a ground circuit provided with a cut-out, operating upon an excess of current therein, and means for including the ground cut-out in the ground circuit after the operation of the line cut-out.

591,427 Galvanic battery; C. B. Schoenmehl, Waterbury, Ct.

591,451 Electric switch; J. C. Cassidy, East Orange, N. J.

591,479 Lock; J. J. Link, St. Louis, Mo.

591,490 Fitting for glow lamps; F. Palm, Nuremberg, Germany.—A holder for glow lamps, consisting of the insulated socket provided with pressure fingers for each terminal, with the naked main wires properly spaced apart.

591,491 Electric switch; J. W. Parkin, Philadelphia, Pa.

591,499 Electric dental mallet; P. Russel, New Market, Md.

591,516 Electrical rail-bond; W. H. Wiggin, Worcester, Mass.

591,590 Switch apparatus; J. P. Coleman, Swissvale, Pa.

591,625 Dynamo electric machine; E. W. Farnham, Chicago, Ill.

591,700 Thermic fire-alarm; K. O. Slosky, Philadelphia, Pa.—A thermic fire-alarm consisting of two concave convex disks having their surfaces corrugated, contact-points carried by said disks, and an electric circuit in which the alarm is included.

591,706 Electric railway; D. Urquhart, London, England.

591,725 Protecting alarm circuit; I. E. Barriclow, Dallas, Tex.

CHICAGO NEWS NOTES.

So far the new woman has not yet invaded the dynamo room, and lady dynamo tenders or engineers are as yet unheard of. "If this should ever change," remarked Mr. Martin J. Isaacs, of Gales commutator compound fame, "our sales would undoubtedly decrease, as the average 'tenderess' would not wish to do away with all sparking in the station."

Mr. C. W. Woodward, who has been manager of the Chicago office for the Electric Storage Battery Company ever since this office was established, has been transferred to the main office at Philadelphia, where he will no doubt have a wider field for his excellent abilities. While the Chicago friends shall miss him very much, they can not refrain from being pleased to hear of his well earned promotion.

These are busy days at the Central Electric Company's place, and it is generally far into the night ere the employés find time to wend their ways homeward after another day's rush of orders. This "rush" does not apply to any one or few particular lines, but seems to pervade the entire supply business. Of course, Okonite and Interior conduit figure very largely in the make-up of a day's business.

The Chas. E. Gregory Company has found it necessary, on account of its constantly increasing business, to again enlarge its quarters, and has secured the entire building, Nos. 58, 60 and 62 South Clinton street, where it will move on November 1, and where it will be better able to satisfy the demands of its customers. The business of the company has steadily grown since its inception, and is to-day probably the largest of its kind in this country.

A special meeting of the Illinois State Telephone Association will be held at the Palmer House, Chicago, on October 20, to consider all matters of interest that may come before the association. One of the subjects to be discussed will be a uniform rate of charges for toll lines, and a definite price for toll lines running into exchanges. Many miles of new toll lines being built each year makes a definite arrangement of these matters more and more important, and local exchanges will no doubt realize this and send delegates to the meeting.

The Western Telephone Construction Company is overrun with orders and is working double time to make shipments on time. Among the more important contracts recently closed, may be mentioned Newark, N. J.; Paterson, N. J., and East and West Orange, N. J., where some large and modern exchanges will be built. Among the orders for interior telephone equipments, one for 1,000 sets for the new Astoria Hotel in New York may be mentioned. This is said to be one of the finest and most modern hotels, and the apparatus to be furnished will be thoroughly in keeping with the high grade of the hotel.

NO MORE LONG-DISTANCE FLIRTATIONS.

"Across the States I speak to thee,
Yet do not fear, I shall be free;
The rates hold ardor down, my own,
On this long distance telephone."

This is what many a clerk is humming over at the City Hall in Chicago of late, Comptroller Waller having issued an order which will put an end to the long-distance telephonic courtships, which seem to have been flourishing over there. The monthly telephone bill came in during the course of the day, and Mr. Waller began a desultory examination of the items. He had not read more than a dozen lines in the long bill before he became greatly interested. It was the report of the city's use of the toll board that engrossed his attention.

To his amazement he found that the Department of Public Works had been talking to Miss So and So, of Evanston; that the Legal Department had called up Miss Smith, of Evanston; Miss Jones, of Riverside; Miss Johnson, of Oak Park, and so on. From the health department the calls extended even to St. Louis, and in two cases long conversations had been held by the police department with a young woman in New York, whom all the researches made by Mr. Waller failed to connect with any police case. Mr. Waller studied the list. He found that the Department of Public Works had talked every working day of last month to Miss Evanston, and on one day matters progressed so rapidly that there were three distinct conversations recorded on the bill.

"I do not like to interfere in such matters," soliloquized the comptroller, "but it seems these courtships are costing the taxpayers a great deal of money. Yet, while it might be a good investment of the people's money, I do not believe it is authorized by the statute."

The telephone bill will be paid this time, and nothing said about it. If the practice continues, Mr. Waller threatens to push his investigations until he knows the name of every young man in the City Hall who is engaged in a long-distance flirtation.

C. E. K.

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Copies can be obtained by inclosing four (4) cents in stamps to the Advertising Department, Baltimore and Ohio R. R., Baltimore, Md.